REQUIREMENTS FOR A MODEL OF CUSTOMER ENVIRONMENTAL BEHAVIOR AND A THEORY OF CUSTOMER ENVIRONMENTAL PERCEPTION

By

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The purpose of this exploratory study was to determine the requirements for a model of customer environmental behavior, develop a theory of customer environmental perception, measure the correspondence between perceptions of retail space and physical reality, and identify potential sources of perceptual distortion.

Urban planning and the behavioral sciences provided a framework for the identification of five requirements for an environmental behavior model. The requirements suggested that the description and analysis of environmental behavior be ego-centered, that the relationship between an individual and an environmental situation be viewed as a reciprocity, involving a dual interchange, that the environmental situation be viewed as possessing objective and phenomenological features, that the environmental situation must be seen as influencing environmental

behavior by acting as a behavioral context and/or as a proximal and distal stimulus, and that the model relate its basic elements, the individual, the environmental situation, the environmental decision process, and environmental response behavior in terms of intersystem congruence.

A theory of customer environmental perception was developed in terms of a customer environmental map construct which was employed as an exploratory behavioral output mode capable of eliciting customers' perceptions of urban retail reality in terms of an array of points representing stores. The points represented cognitively structured information categories related to each other in terms of a subjective set of geographic relations.

The study examined the relationship between cognitive structure and the geographic ordering of stores. A standardized personal interview was administered to thirty-one women. The specification of an expected pattern of behavior regarding the nature of a forthcoming trip, a product class, a purchase intention, and the extent of prior knowledge made it possible to elicit a store set response. Two types of measurements were made, those defining the cognitive structure of stores, in terms of a vector indicating the relative salience of store attributes and a matrix indicating the relative ratings of stores in terms of salient attributes, and those defining the subjective geographic relationship between stores. The vector-matrix

products produced by each interview indicated store preference. Multiple relative and absolute location responses were compared to objective location characteristics to determine the magnitude and direction of perceptual distortion.

Size variation and concentration of store sets, possibly related to sign-learning tendencies, variations in environmental decision process stages, and the functional role of stores, appeared to introduce some unexplained complexities into the relationship between the cognitive structure measure of preference and the geographic measures. Analysis of the results revealed that the magnitude of relative location distortion was greater in the case of less preferred stores and the direction of relative location distortion was different for most and less preferred stores. There was partial support for the greater magnitude of physical distance absolute location distortion in the case of less preferred elements, the magnification of the direction of time absolute location distortion for closer and more distant most preferred stores, the higher rated convenience of closer most preferred stores, and the violation of the metric property of symmetry for physical distance absolute location perceptions.

The interpretation of results indicated that there was considerable value in the future application and continued refinement of the customer environmental map as a model of customer environmental perception. It appeared

that such efforts would improve our understanding of the environmental decision process and provide a valuable input for marketing strategy and urban planning.

INTRODUCTION

The role of the city and the nature of urban problems[1] (Cox, 1962; Lazer, 1971, p. 440) have not been major concerns in marketing thought. These factors have been grouped with other environmental variables and conceptualized as a set of uncontrollable forces to which the individual firm must adapt. The city, however, has long since exceeded some critical mass and become an environment rather than a temporary retreat from natural surroundings (Lynch and Rodwin, 1960; Wurster, 1963; Parr, 1966, p. 39). This has transformed certain marketing variables, including the urban retail structure, into environmental components. The implications of this transformation are especially significant in an era of urban planning.

The distribution of urban retail facilities is a product of entrepreneurial vision, custom, zoning, and the like. The characterization of the city as a marketing institution (Cox, 1962; Lazer, 1971, pp. 440-43) has led

[1]The urban (or city) area is not limited to elements within conventional metropolitan political boundaries but also includes suburban features, which represent the decentralization of production and/or consumption activities (see Schnore, 1956, and Cox, 1962).

to the development of hypotheses concerning retail structure which have included changes in the relative costs of moving goods and people, consumer uncertainty, various aspects of customer behavior, shifting retail location, and changes in retail function as key variables (Proudfoot, 1937; Gist and Halbert, 1956, pp. 90-106; Berry and Garrison, 1958a; Huff, 1960; Boal, 1963; Mertes, 1964; Wagner, 1964; D. L. Thompson, 1966, 1967; Cohen and Lewis, 1967; Van Handel, 1968). The absence of unified theory relating urban retail structure (Durden and Marble, 1961; Eisenpress, 1965, p. 244) has not, however, retarded efforts to plan and construct the urban complex and its retail component. Societal pressure as well as the resource, structural, and productivity dimensions of urban space have left no other alternative (Wingo, 1963, p. 7; B. J. L. Berry, 1965; Fagin, 1967; Goodman and Freund, 1968; Morris, 1969a; Lansing, Marans, and Zehner, 1970).

The paucity of theory is related to a failure to appreciate the constraints placed on numerous urban activities by strong technical, marketing and other interrelations. The integrating effect and pronounced nature of these relations require us to consider the activities as being bound together by an urban complex rather than separate phenomena (Isard, 1960, pp. 673-4; Webber, 1967, p. 401; J. M. Thompson, 1969).

Spatial activities are an excellent example. A considerable portion of urban spatial activities are related

to the purchasing of goods and services. Consumer travel movements are the result of urban spatial patterns as well as agents affecting spatial structure (Huff, 1960; Webber, 1967, p. 401; Lowry, 1970). Thus consumer behavior should represent an important concern in urban environmental design both in terms of the location of shopping facilities and the provision of access to these facilities. Knowledge of the underlying determinants of consumer spatial behavior is an essential input in the rational design of urban environments (Goldstucker, 1966; R. M. Downs, 1970, p. 13).

Marketing, along with other disciplines (McClelland, 1962, p. 133; Gutman, 1966, p. 114; Studer and Stea, 1966, p. 128), must contribute this knowledge to the relevant stages in the urban planning process[2] (Iatridis, 1966, pp. 473-83; Fagin, 1967; Fagin and Tarr, 1967) in order to develop the proper synthesis of the five basic ekistic units of nature, man, society, shells (building units), and

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[2]The complete urban planning process involves five stages of (1) analysis of human needs and objectives and general alternative courses of action, (2) establishment of policy in which alternatives are ranked, on the basis of local, regional, and national constraints and short and long-term effects of psychological, social, economic, political, and legal nature, and selection is based on probability of satisfying present and future needs, (3) programming or translating policy into a detailed course of action, (4) design or planning of appropriate technical solutions and (5) implementation or (a) organization and supervision of execution of the plan, (b) programming for the adjustment of the population to the new or altered physical environment, and (c) establishment of feedback mechanisms in order to assess results, introduce further changes, and possibly train residents.

networks (involved in the movement of man, goods, power, and information) (Doxiadis, 1969). While motivated by self-interest, this contribution is necessitated by continued malfunctions in the urban man-environment system.

Urban Planning and Environmental Malfunction

These malfunctions stem from urban planners' use of unrealistic models, limiting terminology, inappropriate research orientations, and "objective" behavioral criteria.

Cities are being patterned as planned areas bound together by an arterial network with a sense of relatedness derived from an aerial view. The resultant culturally uniform physical space (Hall, 1970, p. 17) is the product of popular knowledge and rules of thumb for the design of physical structures, separate land uses, traffic distribution functions, and urban growth. Such rules are couched in fragmentary, static views of the city or the occasional consideration of urban utopia (Lynch and Rodwin, 1958; Webber, 1967, p. 403; Sommer, 1969, pp. 145-54).

Relationships in urban plans are typically created within physical, rather than socioeconomic, space and are distributed by means of a physical Euclidean spatial system, rather than by non-Euclidean mapping. Such plans seem designed for residents suspended at ten thousand feet and content to spend their lives looking down. As a model of spatial relations, a map plan implies an underlying theory. The choice of a proper model should be an empirical problem

and thus correspond to the phenomena it is designed to represent (Harvey, 1969a, p. 376).

Malfunctions are magnified by the employment of historically preconditioned spatial designations (strip center, department store, rest area, etc.) which focus on physical characteristics and prematurely close space by representing solutions rather than statements of environmental problems (Kates and Wohlwill, 1966, p. 19; Michelson, 1970, pp. 50-3; Studer, 1970, p. 58). Such errors arise from confusing the assessment of designed environments in terms of their influence on behavior with the study of extant environments and their impact on behavior. In the former case behavior constitutes a class of independent variables while in the latter case the opposite is true (Gutman, 1966, pp. 104-5; Studer and Stea, 1966, pp. 130-3).

Urban malfunction is the result of isolating physical planning from human needs and either ignoring or failing to initially specify requisite behavior[3] (Duhl, 1963, p. 151; Studer, 1970, p. 58). A realistic urban model contains elements which are functionally related to user paths and action spaces[4] (Wolpert, 1965; Kates, 1966, p. 26; Carr and

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[3]Both the poor planning of urban designers and the lack of planning by individual entrepreneurs contribute to environmental malfunction. Thus knowledge concerning customer behavior can provide valuable insights for both urban planning and marketing strategy.

[4]An individual's action space is that perceptual and objective area with which he has contact and within which his spatial activities (economic, social, political, religious, etc.) take place.

Schlissler, 1969; Horton and Reynolds, 1969; Appleyard, 1970) and focuses on the effective environment (Gans, 1968, p. 61), that version of the potential environment that is manifestly or latently adopted by users. Persistent disparities between perceived and officially designated areas are the natural consequence of outdated and unrealistic urban models. Although the automobile and mass transportation have replaced the horse, parking facilities reflect little notice of technological change. The traffic artery and curb parking have replaced the shopping promenade without necessary alterations to reconcile the incompatibility of through traffic and ready ingress and egress (Gallion and Eisner, 1963, p. 218).

Sources of urban malfunction have been attacked under the functionalist precept that "form follows function" but such efforts have reduced themselves to urban expressionism (Studer and Stea, 1966, p. 129). More significant has been the use of explicit behavioral criteria in developing planning models (Iatridis, 1966). Unfortunately, the behavioral functions which have been adopted typically correspond only to an objective urban physical pattern. Thus least effort principles are seen as governing consumer spatial behavior and convenience has become a chief consideration in planning amenities (Parr, 1966, p. 42; Willis, 1969, p. 189). There is a pressing need for urban plans which begin with a definition of empirically determined requisite behavior and environmental needs rather than the specification of a physical system.

Behavioral Science Contributions

The behavioral sciences offer the most obvious route for the effective translation of relevant behavioral goals into urban plans or plans for the provision or retail facilities in an urban complex. Yet the actual contribution of the behavioral sciences has been limited by the availability and character of past research (Rosenberg, 1965, p. 3).

Anthropologists have tended to view the environment as either a setting for primitive culture or as a single physical setting over which culture has triumphed (Kates, 1966, p. 22; Schnore and Lampard, 1967, pp. 29-32). Sociology and psychology, with few exceptions (Heyman, 1964; Kates and Wohlwill, 1966; Craik, 1968; Michelson, 1968, 1970; Proshansky, Ittelson, and Rivlin, 1970; Wohlwill, 1970), have adopted an implied doctrine of environmental neutrality.

Sociological conceptualizations picture the environment as a dependent function of social organization and change (Kates, 1966, p. 22; Schnore and Lampard, 1967, pp. 29-32). Even human ecology, which studies the relations between the physical environment and social science variables, treats space as a medium rather than a variable with a potential effect of its own. The tendency to concentrate on aggregate behavior has prevented ecologists from dealing with the more microscopic relationship between the individual or household and the environment. Human ecology is rooted in a period in which the major consideration was human adaptation rather than active intervention to create an environment

capable of satisfying a multitude of explicit goals. Such intervention creates demands for a new variety of knowledge (Michelson, 1970, pp. 17-22).

Lacking such information, sociologists have shared in the planning process by substituting their own behavioral and social criteria for those of future residents. They have neglected even the most apparent trade-offs, e.g. convenience versus density, and blindly adopted maximum social intercourse as the principle goal of planning. Urban sociological research tends to emphasize residential units while excluding the total pattern of relationships which help shape human and consumer spatial behavior (Willis, 1969, p. 189).

Psychologists traditionally accept the biotic and physical environment dichotomy and concern themselves almost exclusively with biotic relationships. Studies of perception and symbolization of discrete stimuli either ignore the urban environment or treated it as neutral (Sommer, 1966, p. 59; Wohlwill, 1966).

In the behavioral sciences "the proper study of mankind has been man" (Kates, 1966, p. 22). The physical environment has been the research domain of the health and design related professions. Thus environmental stimuli are presented as specific etiological agents of sickness, complex systems relevant mainly to lower life forms, or objective physical structures (Kates, 1966, p. 24).

The small body of behavioral research which does focus on environmental matters must be approached with caution. Attempts to transfer findings based on study of lower animal life forms tend to confuse analogy with homology. Laboratory research usually avoids the degree of complexity present in the range of variables otherwise studied in an urban setting. Even those studies using multivariate designs outside the laboratory generally ignore the cityscape (D. L. Thompson, 1966; Griffin, 1969; Greenbie, 1971). Finally, it is doubtful whether environmental concepts developed at the level of the room, dwelling, neighborhood, etc. (or shop, department store, center, etc.) are applicable to the urban scale or whether "scale free" concepts are possible to develop (Kates and Wohlwill, 1966, p. 17).

Although the desire for a more rigorous theory of urban structure has led behavioral and social scientists to study the dynamics of urban retail structure, they have generally neglected customer behavior (Scott, 1970, p. 168). Thus, in spite of an existing body of environmental and urban behavioral research and a variety of analytic techniques, there is an acute absence of both basic research and coherent theory dealing with the retail structure as an urban environmental component (Scott, 1970, p. 181).

The Need for a Model of Customer Spatial Behavior

The development of a model of customer spatial behavior is thus a requirement for progress in forming a theory of urban structure and reducing the malfunctions inherent in urban plans. Armed with such a formulation, marketing can both contribute to the urban planning process and help predict the consequences of alternative urban plans. Similarly, such a model would help marketing management forecast the consequences of changing urban structure. Thus there is a need to "become more theoretical in order to become more practical" (Alderson, 1965, p. 4).

At the theoretical level, a conceptual framework will provide an alternative to mere fact gathering, help establish the relevancy of collected data, and provide a frame of reference for future research (Kornhauser and Lazarsfeld, 1964, p. 15). It would allow research to be integrated into a meaningful whole and provide a perspective for assessing the significance of new research. The model would be useful for consumer and urban theory construction and for the development of testable hypotheses. Finally, it would contribute to our knowledge concerning the performance of consumers' psychological systems (Engel, Kollat, and Blackwell, 1968, pp. 35-6).

Customer Spatial Behavior, Environmental Behavior, and the Requirements for a Model of Environmental Behavior

To develop such a body of theory we must begin by drawing a conceptual distinction between the human behavior

and its subsystem, environmental behavior. The environmental behavior subsystem involves "the kind of human action which addresses itself to space, place, or environment as a whole, not simply to other human actors" (Blaut, 1969, p. 8). The relationship between customers and a proposed or existing urban retail structure has a similar spatial dimension which is a special case of environmental behavior and thus distinct from other types of consumer behavior. To recognize this relationship is to form the basis for a link between the customer and the urban physical matrix in a manner not unlike the link which others have sought to establish with respect to the human matrix (Kover, 1967).

To facilitate the study of customer spatial behavior we must place it within the context of an environmental behavior model. While retaining the integrity of a distinct and special case, customer spatial or environmental behavior will thus share the essential characteristics of the more general subsystem. Since the nature of environmental behavior rarely has been explored, it is necessary to begin by setting forth, in general terms, the requirements for a model of such behavior. These criteria include:

1. The description and analysis of environmental behavior must be ego-centered.

2. The relationship between an individual and an environmental situation[5] must be seen as a reciprocity, involving a dual interchange.

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[5]In the general case the term environment refers to the physical environment as opposed to non-physical cultural, social, and psychological systems. The present

3. The environmental situation must be seen as possessing objective and phenomenological features.

4. The environmental situation must be seen as influencing environmental behavior by acting as a behavioral context and/or as a proximal or distal stimulus.

5. The model of environmental behavior includes four basic elements which must be related to one another in terms of intersystem congruence.

It is necessary to examine these criteria and their implications and determine how they influence the framework of a model of consumer spatial behavior. The model would seem to be suitable if its elements and relationships are conceptually consistent with the general perspectives of theory and practice in marketing and urban planning, help correct present misconceptions concerning urban spatial behavior, and provide a realistic explanation of the phenomena under investigation.

Ego-Centered Environmental Behavior

It is necessary for any model building process to include an appropriate conceptual scheme which resembles, in certain desired features, the phenomena under investigation (Rigby, 1965, p. 112). Thus at the outset attention

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concern, however, is confined to urban settings. Hence environment refers to the man-altered urban physical environment. The term does not imply a denial of the role of important urban physical elements which are not man-made. Instead, the man-altered physical environment represents a special set of cases along urban to rural and natural to man-influenced continua (see Craik, 1968).

must be given to the unit of observation (Chapin, 1961, p. 305).

The ego-centered criteria does not deny the value of studying spatial systems, cultural regions, group environmental behavior, group spatial needs, or macroscopic connections. Instead it casts the model at the lowest reductive level capable of producing micro-theory in order to relate the environmental situation to the smallest unit common to all social levels, the individual (Kain, 1967, pp. 163-4; Blaut, 1969, pp. 8-9; Michelson, 1970, pp. 45-6). Thus, as an active environmental participant, the individual becomes an integral part of the problem (Fatouros, 1968, p. 520; Proshansky, Ittelson, and Rivlin, 1970a, p. 4). In this manner space preference (Isard, 1956, pp. 84-5, 144-5; Huff, 1960), or any other exogenous social or psychological variable, can be seen as operating in an environmental situation and information field and accounting for environmental response variation. The identification of patterns of environmental response becomes possible because such behavior is enduring and consistent over time and situation. Yet only an ego-centered view can cope with the expected diversity through time and space, and with the continuous variability in any given space and time, of environmental response behavior (Proshansky, Ittelson, and Rivlin, 1970c, pp. 29-31).

Such variance has been examined in terms of larger units of observation (Huff, 1962b, 1963, 1964) but such

efforts have not proven successful. Alternatively, an implied belief in the adaptability of economic institutions has led to a total concern with urban retail structure as a guide to customer spatial patterns. Yet, even if allowance is made for this assumption, it is not stores that visit one another. The spatial character of environmental behavior arises for the fact that people are separated from each other and from non-residential activities (Michelson, 1970, p. 46).

The distinction between consumer and human behavior is a necessary artifact. The absence of an adequate model of human behavior has not abated the defense of separate models of consumer behavior. These formulations have been defended on grounds of reported differences in the consumer role as opposed to other types of behavior and, ironically, on the basis of the synonomous nature of human and consumer behavior as evidenced by the pervasive association of consumption goods and all human activity (Engel, Kollat, and Blackwell, 1968, p. 5).

In truth, such distinctions are a matter of theoretical perspective (Sommers and Kernan, 1966, p. 5). The productivity of the role distinction and the absence of a general theory of human behavior form the best argument for the creation of separate models. To the extent that all behavior is choice behavior or that consumer and human behavior are identical, studies in the former enrich our general understanding (Tucker, 1966, pp. 55-60). Instead

of precluding the employment of ego-centered customer models, this realization limits the character of analysis. It requires careful discrimination in borrowings from other disciplines dealing in other roles and/or other behavioral subsystems and the simultaneous development of concepts, tools, and hypotheses suited to the peculiar nature of customer environmental behavior (Halbert and Durkson, 1966, p. 30; Myers and Reynolds, 1967, p. 2).

This approach is consistent with marketing theory which regards the consumer as the central factor in the marketing process. While not limited to the study of the consumer, marketing theory is advanced by increments in our knowledge concerning customer behavior. Such advances are the basis for improvements in marketing practice and the economic system, whose success depends on the ability of the marketing process to anticipate, create, and deliver satisfactory assortments (Alderson, 1965, p. 144; Nicosia, 1966, p. 5; Sommers and Kernan, 1966, p. 3). The ego-centered criterion can furnish a basis for added insight as long as tendencies to universalize findings are couched in the realization that the urban context is merely one case and customer spatial behavior is merely one facet of consumer behavior.

Microscopic spatial theory has been labeled as a barrier to the "science of society as a whole" (Stewart, 1948, pp. 31-2) because it implies an examination of properties which are not easily observed. Larger units of observation

involve less demanding methodology but their value as planning units is suspect.

Thus, the small group, a convenient empirical unit, tends to be associated with severe planning problems when its dynamics are generalized to a higher urban scale (Rosenberg, 1965-6, p. 5). The neighborhood, a useful sociological concept, has a subjective quality which prevents its ready manipulation in an urban model (Willis, 1969; T. Lee, 1968). Yet larger residential units, which typically comprise the divisions of urban plans, do not correspond to urban sociological structure. It is difficult to make observations at this level because these varied and overlapping residential areas are perceived differently by inhabitants.

Theoretical and empirical considerations and current trends in social science research have made the household the most serious alternative to the individual as a primary unit of behavioral analysis. This view holds that certain basic human needs are "met only in the family, making it a small, unitary social system, having its own independence and integrity" (Chapin, 1961, p. 306). Thus it is maintained that consumption related behavior occurs in or through a household unit which possesses unique properties that act as mediating variables but significantly differ from the functionally analogous intervening variables which characterize individual behavior (Sharp and Mott, 1956; Wolgast, 1958; Coulson, 1966). The notion of the customer purchasing

agent and household representative entering the market to replenish or extend an assortment of goods needed to support expected patterns of future behavior has been reinforced by evidence indicating the role of the family in purchasing decisions (Foote, 1961, p. 5; Whiteside, 1964; Alderson, 1965, pp. 144-5; Myers and Reynolds, 1967, pp. 245-6, 261).

Close observation, however, has revealed this agent to be an imperfect interpreter of household preference. Such preference tends to vary along product and brand dimensions and constitutes only one of a configuration of variables related to purchase intention (Coulson, 1966, pp. 1-2). Furthermore, the typically vague demarcation between consumer and customer roles suggests that a general category of customer behavior be used to include both cases when the two roles are congruent and when only pure customer behavior is involved (Halbert, 1966, p. 72). Thus environmental behavior related to the retail structure is designated customer environmental behavior. In this way the integrity of the ego-centered unit is preserved by allowing the previously considered variables to be regarded as factors affecting the individual decision process.

In effect this rules out the application of methods designed to apply to aggregate behavior. Included in this category is a set of tools based on the gravity concept of interaction. Although they have been variously modified to account for spatial response to urban retail structure (Carrothers, 1956; Gist, 1968, pp. 164-73; Scott, 1970,

pp. 169-78), gravity models are essentially empirical tools useful only for macroscopic description. They represent spatial analogies to Newtonian physics which have grown out of a dissatisfaction with the descriptive progress of microscopic theory and the conviction that group members exhibit different behavior than they do as individuals (Stewart, 1947, 1948, pp. 31-2; Isard, 1960, p. 464).

The gravity concept postulates "that an attracting force of interaction between two areas of human activity is created by the population masses of the two areas, and a friction against the interaction is caused by the intervening space over which the interaction must take place" (Carrothers, 1956, p. 94). This space, urban or otherwise, is conceived in Newtonian terms as a mass structured according to principles governing "in an overall fashion the range of behavior of individual particles, both constraining and initiating their action" (Isard, 1960, p. 494). The restriction to population and distance, although they may be consciously employed as general indexes of attraction and repulsion (Gist, 1968, p. 168), and the application to human aggregates lead to the assumption that the idiosyncracies of individual or even small group behavior are cancelled or averaged out (Isard, 1960, pp. 494, 512-5).

This idea conflicts with the ego-centered proposition and contradicts evidence that both individual customer behavior and the effect of the parameters of spatial interaction are significantly different (Huff, 1962a, pp. 64-5;

Moore and Mason, 1963; Revzan, 1966; Scott, 1970, p. 170; Mason and Moore, 1970-1). Unfortunately, while disaggregation and stratification of gravity data lend additional precision to findings concerning spatial behavior, such efforts often prove impossible in practice.

This restricts the role of gravity formulations to macroscopic description (Isard, 1960, pp. 515-6; Moore and Mayer, 1966, p. 830; Kain, 1967, pp. 163-4; Mason and Moore, 1970-1) and excludes their application as predictive planning tools. Attempts to employ variables which seem statistically related to urban behavior at the aggregate level have proven almost universally unsuccessful at reduced levels (Stewart, 1942; Blount, 1964; Horton and Reynolds, 1969, p. 71). The failure of gravity models is merely one example.

Reciprocity and the Customer-Environment Interchange

The order in spatial behavior, which is sometimes exposed but never explained by aggregate concepts, is the product of environmental interaction. In this context it is hardly surprising when observed empirical regularities are absent when similar retail interaction phenomena are studied under differing environmental circumstances (Huff, 1962a, pp. 66-7).

The dynamics of the customer-environment interchange suggest that plans for the retail structure and the total urban complex reflect a knowledge of human spatial needs, uses of space, and the social context of these uses, as well

as the economics of spatial usage because the ultimate product of urban design is a physical matrix within which a social system will operate (Proshansky, Ittelson, and Rivlin, 1970a, p. 493). A customer does not merely move through a neutral environment in order to satisfy his needs, search for variety, etc. His relationship to that environment is an active unity involving both the satisfaction of needs and the influence of the environment on behavior. This interaction results in the transformation of the individual and may create new needs or other behavior modifications. These altered characteristics interact with the environment to produce changes in the latter, thus creating a continuously changing mechanism. The redefined reciprocity between the customer and the urban environment may be considered a state of learning in a continuous learning process. The changing individual condition and environmental situation suggest that the environment is a field of learning and that the customer's active participation through environmental contact is an involvement of learning (Rosenberg, 1966, p. 4; Fatouros, 1968, p. 520; Proshansky, Ittelson, and Rivlin, 1970c, pp. 34-5).

This effectively excludes the isolated study of either human or physical variables. Instead, the analyses of this active unity should proceed by conceptualizing interaction as existing primarily with respect to the structure of the urban matrix rather than with its individual parts or elements. In this way the field of learning is viewed as a

set of relations between environmental elements (Fatouros, 1968, p. 520).

This perspective challenges the theoretical foundations of the gravity concept and casts doubt on the potential contribution to a theory of consumer environmental behavior of goods classification systems, trade area delineation procedures, and decision process models.

Unlike its Newtonian counterpart, the gravity concept does not include all relevant variables known to be operative in the real world. This neglect of the interrelatedness of urban activities acts as a detriment to the analysis of the urban system. As its most important consequence, this means that gravity models are neither theoretically nor empirically suited for urban retail application (Huff, 1962a; D. L. Thompson, 1966, pp. 5-7).

By reducing environmental factors to population and distance measures, gravity models neglect the elements and relations present in urban space and effectively eliminate the urban environment as an operating influence. The distance concept, for example, fails to comprehend the differential character of urban space, a function of such variables as travel mode, store and good type, community size, topographic conditions, population density, work place, and retail agglomeration and diversification. Further, it ignores those ego-centered variables which are associated with different spatial habits and tendencies (Goldstucker, 1966, pp. 299-300; Moore and Mason, 1966; Scott, 1970,

pp. 60-5). While gravity advocates have admitted the relation between the nature of urban structure and variance in spatial behavior (Converse, 1949, p. 383), gravity models have been modified only substituting other variables for population and distance and applying them to different types of urban competitive conditions (Gist, 1968, pp. 171-2).

But simple summary variables are neither suited for spatial analysis of urban retail competition nor capable of dealing with relevant environmental influences or their urban character. These defects have left theorists in confusion as to the non-uniformity of time and distance in urban settings. Hypotheses functionally relating distance to population or itself have attempted to resolve this debate and have revealed an implicit, but insufficient, recognition of urban environmental influence (Carrothers, 1956, p. 97; Scott, 1970, p. 170).

Such limitations can be traced to the essentially rural character of the gravity concept. Reinforced by apparent support for the analogy between rural population and gas molecules, gravity advocates have sought to extend the comparison to an urban context. This has been accomplished by either ignoring environmental differences or by regarding population density as a process of molecular bonding and the city, a high density gas, as a liquid (Stewart, 1948, p. 54). Yet despite urban retail applications (Ellwood, 1954; R. L. Nelson, 1958, p. 149; Lakshamanan and Hansen, 1965; Voorhees and Lakshamanan, 1966), the gravity concept remains dependent

on the neutrality of intervening space. Its origin as a concept applicable to cities of some size and a number of miles apart has prevented its successful use in the analysis of customer movement within the limited confines of a city containing a broad assortment of goods (Reilly, 1929, pp. 13-15; Converse, 1949, pp. 382-3; Huff, 1962a, D. L. Thompson, 1966, p. 5).

Customer response to scrambled merchandising, retailers stocking more than one type or class of product, and the existence of different type or even multiple purpose shopping trips serve to destroy the gravity concept as a vehicle of urban analysis (Huff, 1964, p. 36; Sparicio, 1966). In retrospect, the limited applicability of gravity models to nearby populations in studies involving a broad geographic frame (Stewart, 1965, pp. 70-1) seems to be an early indication of the eventual failure of intra-urban trade are delineation attempts (Reynolds, 1953; Mayer, Johnson, and Mason, 1970).

One solution has been the recharacterization of urban space in terms of decision alternatives. Thus, the intervening opportunities model denies any necessary relationship between distance and movement and posits the number of individuals traveling a given distance as being directly proportional to the number of opportunities at that distance and inversely proportional to the number of intervening opportunities (Stouffer, 1940). Retail applications of the model have served to indicate that distance fails to perform a

continuous function and thus have provided a conceptual foundation for the probabilistic definition of demand surfaces (Huff, 1963, 1964).

The value of redefined urban space is, however, overshadowed by difficulties in defining opportunities, reliance on inadequate concepts of behavioral equilibrium, dependence on largely homogeneous opportunities and population and a neglect for the variable influence of distance (Scott, 1970, pp. 62, 179-80). While the opportunity concept treats space in a manner generally consistent with the distribution of retail alternatives, it still implies that the intervening urban space is essentially neutral.

The ultimate source of this confusion is the rural orientation of retail theory. Although retail establishments and sales have been historically concentrated in metropolitan areas, the earliest analysis of such commerce focused on the distribution of retail trade in rural areas. While rural patterns were originally investigated because they involved a more manageable unit of analysis, the conclusions drawn from these studies have formed the basis for current views on consumer shopping behavior and trade area analysis. Current views of patronage distribution, for example, arise from the marked overlapping and differential configurations observed in early delineations of social zones of retail influence which revealed different travel patterns associated with fashion and shopping goods as compared to convenience or bulky items. The complex spatial

distribution of demand in the rural commercial order implied the operation of a "highly selective mechanism of consumer choice" (D. L. Thompson, 1966, p. 2).

Differences in urban and rural spatial habits and attitudes (Swedner, 1962; Goldstein, 1966; D. L. Thompson, 1966) suggest that a different and perhaps more complex mechanism may operate in the urban context. But such distinctions have been ignored and efforts have been devoted to identifying customer spatial regularities in trade are studies which relate travel to types of goods and their associated distributions (W. A. V. Clark, 1968, p. 396; Scott, 1970). The development of the current classification of consumer goods (Copeland, 1923; McCarthy, 1971, pp. 300-19) (convenience, shopping and specialty) and the concept of range (Berry and Garrison, 1958a, 1958b; Garner, 1967; Sparicio, 1966; Scott, 1970, pp. 13-15, 157-66) are the most significant developments in this theoretical tradition.

Such constructs are unjustified abstractions which neglect the differential influence of the total urban environment. Relationships drawn between individual products and customer spatial tendencies ignore the existence and influence of retail institutions (Jacobi and Walters, 1958; Bucklin, 1963). This produces numerous empirical oversights and prevents the systematic treatment of such factors as the coincidence of search and purchasing trips or multiple purpose trips in which different types of goods

are purchased together (Murdie, 1965, p. 212; Kleimenhagen, 1966-7, p. 39; W. A. V. Clark, 1968, p. 387).

The absence of unique product classifications over time and the simultaneous assignment of multiple classifications to the same physical product provide the realization that the conventional goods classification system is actually a device for the discrete designation of spatial buying patterns. Such spatial responses are observed with an implied model consisting of three variables, consumers, a distribution of goods, and marketing mix influences. The retail structure itself plays a passive role. Certain contradictions between the spatial principles advanced by the goods classification system and empirical evidence are rationalized by the more recent assortment concept (Alderson, 1965, pp. 144-9) insofar as it implies a multiple purchase behavior tendency. Still the level of abstraction continues to prohibit a systematic treatment of urban retail relations and other environmental variables.

The absence of environmental considerations has also limited the character and value of trade area analysis and retail location models as predictive techniques designed to deal with the provision and location of retail facilities and sources for the development of a theory of urban structure (Scott, 1970, p. 168). Such investigation was originally limited to estimates of population within an arbitrarily determined market area (Imus, 1961) with occasional analysis of composition by income group. A variety of ratios of

frontage or floor space or number of stores to population were employed in this connection. More recently, urban population shifts, metropolitan growth, rising per capita income and attendent changes in demand and car ownership, and changes in the technology and structure of retailing have increased both the size and risk of urban retail investment and necessitated more reliable analysis (Scott, 1970, pp. 171-2).

The result has been the development of a loosely connected five-stage evaluation process consisting of trade area delineation, determination of gross and net adequacy (potential), forecast of expenditures for relevant products, and site evaluation (Gist, 1968, pp. 161-228). While environmental variables are considered in the final stage, their presentation is typically limited to descriptive models of retail structure and loosely related "principles" of site evaluation which either rely on social physics notions or focus on physical relationships and neglect reciprocity as a spatial determinant of demand (Cohen and Applebaum, 1960; Gist, 1968, pp. 201-28; Scott, 1970, p. 18).

The omission of reciprocity has consequences which extend beyond notions of gravity, goods classification or trading area. The most important effect is the absence of environmental response in models of consumer decision processes (Nicosia, 1966; Engel, Kollat, and Blackwell, 1968). In fact, such models remain trapped in the rural abstractions

of earlier formulations and lack a comprehensive description of the morphology and mechanisms associated with store choice.

The relationship between the customer and the retail structure is defined in terms of a purchase process (Nicosia, 1966, pp. 179-84; Engel, Kollat and Blackwell, 1968, pp. 444-50). Actually this stage is limited to customer-store environment interaction and thus exemplifies the neutrality doctrine with respect to variables external to the store environment, except where, like parking facilities, they may be treated as store characteristics.

Preceeded by problem recognition and possible stages of external search for alternatives and evaluation of alternatives, the purchase process involves four related sets of variables, a prepurchase intentions typology, consumer characteristics, store environment characteristics, and purchase outcomes. With consumer and store characteristics acting as intervening variables, the remaining factors are employed to form an empirically identifiable intentions-outcome matrix along product and brand dimensions. The result is a severely restricted role for environmental factors and a failure to integrate store choice and purchase processes.

Store choice (Engel, Kollat and Blackwell, 1968, pp. 451-64) is never actually integrated into decision process theory. It exists instead within a largely independent scheme composed of four variables, including evaluative criteria, perceived characteristics of stores, a

comparison process, and an acceptable-unacceptable store dichotomy. The fixation on product and brand choice results in this scheme containing fewer explicit relationships than might be expected. The nature of the comparison process, for example, is never made clear. It is not specified whether a direct comparison between perceived store characteristics and evaluative criteria, or an indirect comparison, involving surrogate indicators and/or standardized store choice strategies occurs. Further, the tendency to focus almost solely on product and brands has left the mechanism producing the acceptable-unacceptable store decision unexplored.

Yet the consequent rationalization holds, even in the absence of published evidence, that the bulk of patronage is not dependent on the store choice process but instead is usually the result of satisfactory experience (Engel, Kollat and Blackwell, 1968, p. 451). The conditions necessary for the absence of the store choice process are stated as unknown. Thus in the final analysis, decision process models follow the doctrine of environmental neutralism. While, in many respects, they represent a synthesis of the most recent advances in the theory of consumer behavior, they are incapable of significantly contributing to a model of environmental behavior and thus to the theory and practice of urban planning.

The reciprocity proposition requires a reliance on constructs which treat spatial behavior and the retail

structure as interdependent. Store choice, thus, becomes the process, rather than the act, yielded from the interaction of changing customer characteristics and changes in the structure of the urban matrix and its retail component. The limited contributions of current approaches suggests the need to establish a new framework for such analysis.

Dual Definition of the Environmental Situation

Environmental definition has ranged from objective physical description to phenomenological characterization. Neither extreme is desirable for our purposes. In the former case the environment is fragmented into discrete quantifiable stimuli which are specifically related to experience and behavior in a manner consistent with experimental and Watsonian behaviorism. The phenomenological view denies the validity of this position and instead treats the environment as it is experienced, in terms of transformed symbolic stimuli which comprise an inner psychological environment (Kates, 1966; Proshansky, Ittelson, and Rivlin, 1970c, p. 28).

Philosophic antecedents of objective definitions may be found in Laplacian optimism which maintained the conceptual possibility of describing the history and future state of each atom in the universe. Environmental determinism, an outgrowth of simplified Laplacian idealism, transformed the original contention into a belief that human behavior was predictable in terms of the environment. The development

of the Heisenberg uncertainty principle and the growing conviction that environmental response variation was somehow related to environmental perception however, cast doubt on such simple cause and effect interpretations (Hagget, 1966; H. M. Mayer, 1967, p. 231; Mann and Hagevik, 1971).

The resultant debate between advocates of determinancy and response variation, rooted in some form of free will, has produced numerous compromises such as variations of satisficer models. Most significant, however, has been the development of probability constructs which treat the opposing views as a matter of scale (Hagget, 1966, pp. 23-6). Elements of both forms of compromise are found in Huff's (Huff, 1962b, 1964) approach to consumer spatial behavior.

Dropping the requirements for perfect choice discrimination and maximizing behavior, Huff modified earlier gravity formulations in order to calculate the relative expected utilities of different retail alternatives. Relative utilities are then used to explain patronage distribution in probabalistic terms and account for observed variance in shopping patterns. The chief flaw in the Huff model is limiting shopping alternatives to those within a given radius. The model assumes away a critical factor in the choice process and produces probability statements which conflict with observed dimensions of habit, inertia, and problem solving (D. L. Thompson, 1966, p. 8). An analysis of these weaknesses provides an insight into an improved method of defining a given environmental situation.

The ego-centered study of environmental behavior suggests, as a first approximation, a dichotomy involving the customer participant and the environmental situation. The existence of a single set of physical environmental conditions does not, however, result in single, uniform view of the situation (Proshansky, Ittelson, and Rivlin, 1970c, pp. 35-6). A multiplicity of views are produced by the active unity of reciprocity, the phenomena of selective perception, and differences in perception.

The first two characteristics of a model of environmental behavior imply that the customer does not passively react to environmental factors impinging on him. A variety of cognitive activities, including expectancies, attitudes, and symbolic transformations mediate and modulate the impact of environmental forces (Kates and Wohlwill, 1966; Sonnenfeld, 1966). Complete attention to the physical effects of the urban environment ignores the human propensity to symbolize experience and to react to both physical and symbolic stimuli (Kates, 1966, p. 23). The perception underlying a customer's reaction to physical urban stimuli and their associated symbols is the product of environmental experience as well as expectancies, built up with regard to environmental constants to which he has become habituated.

To conceptualize the relevant environmental phenomena to which the customer reacts, it is necessary to define the environment in a manner which comprehends the relationship between the physical and symbolic environment and environmental

response (Proshansky, Ittelson, and Rivlin, 1970c, p. 28). This requires the use of a dual definition which embodies objective and phenomenological facets.

This position must, however, be immediately qualified to account for selective tendencies. Since the urban environment contains more information at any moment than the customer's cognitive capacity can handle, perception is highly selective (Parr, 1966, p. 41; Carr, 1970, pp. 522-4). Finite perceptual and storage capabilities influence the character of customer decision processes (Wolpert, 1964, p. 537; Parr, 1966, p. 41) and thus the nature of environmental definition. The measure of visual or symbolic input is not the number of different images or environmental elements which are present or even seen. Environmental definition continues to have objective and phenomenological features but is limited to that which is relevant from the ego-centered view.

Yet environmental selectivity is not uniform. Increasing evidence indicates the presence of significant differences in environmental and spatial perception by urban and rural inhabitants and among urban residents of differing socioeconomic backgrounds (Marble, 1959; Swedner, 1962; Goldstein, 1966; Scott, 1970).

Under certain circumstances these differences appear to dominate the physical aspects of location in determining customer spatial patterns (Marble, 1959).

The failure to consider these perceptual dynamics limits the Huff model, despite its other strengths, to the treatment of situations defined in terms of environmental determinism. The inclusion of all retail alternatives within a given radius implies the perfect perception of the urban environment in all its objective complexity. To the extent that Huff's comparison mechanism may operate, it surely applies only to elements in the retail landscape which are within the customer's problem space. Arbitrary physical determination of alternatives makes perception a function of travel time and distance (D. L. Thompson, 1966, pp. 8-9) and directly conflicts with the requirement for a dual definition by adopting a position of environmental neutralism.

The diversity of elements in the objective retail structure reinforces the effect of heterogeneous perception in making a dual definition of the environmental situation necessary. The unequal generative capabilities of similar types of retail units, generally ignored by the gravity approach (Davidson and Doody, 1966, p. 121), suggests that the properly defined environmental situation exhibits irregular features produced by both objective retail diversity and perceptual heterogeneity (Sparicio, 1966; Gruen and Gruen, 1967, p. 320; Mason and Moore, 1970-71, p. 37). This invalidates any simple notion relating consumers and products or brands in an abstract neutral

space and presents a difficult problem to marketing theorists.

Two conventional solutions offer, at best, only partial resolution of these difficulties.

First we find attempts to relate store classification system to the goods typology (Bucklin, 1963; Kleimenhagen and Stampfl, 1968). In this way it is possible to account for temporal changes in either system and to make the environmental nature of the retail unit more explicit (see Krugman, 1960, and Winkel and Sasonoff, 1970 for a different approach). Such an approach still fails in only partially defining the environmental situation and thus being unable to deal with the variable response to similar types of establishments (Huff, 1964, p. 34; Revzan, 1966; Gist, 1968, pp. 175-8).

A more sophisticated refinement is offered by redefining the nature of satisfaction so as to give it global qualities extending beyond product evaluation to involve the experience surrounding acquisition (Cardozo, 1965; Newman, 1966, p. 218; Steiner, 1966, pp. 209-12). Shopping thus becomes an environmental experience occuring in a spatial loop (or other configuration) and beginning at some origin, proceeding over some route by means of some transport mode, continuing through retail elements, and returning to the place of origin (or other place perceived as the "end") (Martineau, 1958; Newman, 1966, p. 218). The trip

involves elements of purchase and search, although search is not limited to the shopping experience and may even be chiefly associated with other activities and thereby restrict the extent of spatial behavior. Extensivity is thus a variable of considerable importance and a function of the perception of the buying process, percentage of the budget involved, type of goods, and the differential advantage of these goods and stores as well as the perceived results of prior search (Udell, 1966; Bucklin, 1967; Engel, Kollat, and Blackwell, 1968, pp. 378-421; Gist, 1968, pp. 157-9; Mason and Mayer, 1970a).

The global satisfaction concept and its implications are consistent with the reciprocity notion but must be complemented by a treatment of costs. If shopping is an environmental experience then patronage is also a function of the cost of traversing space rather than a function of intervening space itself. Gravity, trade area, and goods classification theorists have treated this relationship in somewhat different manners.

In gravity formulations the distance exponent has been adjusted to account for trip type. This is intended to reflect individual unwillingness to travel the same distance for all types of trips. Alternatively, it has been suggested that this exponent may be a variable function of distance itself. Thus the by-products of urban growth, such as congestion parking, traffic, etc., are seen to result in the friction per unit of distance against

patronage interaction being greater in an urban area than in less developed space (Converse, 1949, p. 383; Carrothers, 1956, p. 97). The general omission of such considerations in conventional gravity approaches has led to a criticism of their ability to predict intra-urban customer movements (Huff, 1962a, pp. 64-5). Such deficiencies render gravity model incapable of dealing with situations in which the perceived costs of traveling to a larger and closer retail alternative are greater than those associated with movement to a smaller and more distant alternative. Yet even with exponent modification, there is little more in the gravity approach than a recognition of the existence of costs or friction. No attention is given to their specific roles in an environmental decision process.

Other theorists have dealt with such matters by modifying the spationally dimensionalized economic theory of land use determination. They have employed the idea of costs and satisfaction as an index of environmental experience and a basis for explaining retail structure in terms of customer search propensities (Holton, 1958; Kelley, 1958; Cox, 1959; D. L. Thompson, 1967). Thus various explanations of spatial movement and patronage employ cost and satisfaction as common denominators of urban environmental experience. In this way the spatial hypotheses which actually underlie goods classification theory have been made explicit (Kleimenhagen, 1966-7).

From the standpoint of the dual definition criteria, the central issue is the assumption that patronage decisions involve the objective analysis of costs and satisfactions and the use of some maximizing criterion (D. L. Thompson, 1966, p. 11). Several questions arise in this connection.

Attempts to list and classify the costs associated with shopping (A. Downs, 1961; Bender, 1964) have served primarily as indications of potential sources of environmental irritation rather than as relevant cost functions. The distinction between potential and salient costs is usually overlooked. It is interesting to note the lack of corresponding efforts associated with the study of satisfaction. This is an understandable example of the social science tradition which concentrates almost exclusively on malfunctions in social and behavioral systems. However, in this case there is the crucial implication that cost and satisfaction are positive and negative counterparts in a continuous function. Thus the absence of environmental irritants (costs) would correspond to the presence of a certain undefined quantum of either satisfaction or slack, except when an unusual coping mechanism or a non-positive stress-tolerance threshold operates (Wolpert, 1966). This relationship is not obviously apparent and neither is the validity of a single measure for environmental cost and satisfaction.

Such obstacles would be surmounted by the use of a method for comparing costs and satisfactions existing with

respect to the same environmental source (e.g., varying degrees of traffic congestion), different environmental sources (e.g., varying degrees of traffic congestion and perceived character of intervening neighborhoods), and different environmental and nonenvironmental sources (e.g., varying degrees of traffic congestion, the perceived character of intervening neighborhoods, and expected monetary savings). These unresolved difficulties (Isard, 1960, p. 256; Goldstucker, 1965, p. 315) have been considered only in terms of criteria supposedly employed by customers in making environmental decisions.

In the simplest approach, satisfaction exists as either a constant or a variable limited to association with a product. This yields the conclusion, associated with the traditional concept of range, that a customer will seek to minimize the travel cost for the individual good (W. A. V. Clark, 1968, p. 387). Other more sophisticated deductions suggest that the customer maximizes the result of his closest travel effort (W. A. V. Clark, 1968), maximizes the total results of shopping by equating some variation of marginal costs and satisfaction (Holton, 1958; Kelley, 1958; A. Downs, 1961), or maximizes the "return" from a given budget of time, effort, and money (Cox, 1959).

These conclusions fail to account for the complexities introduced by internal search and prepurchase search activities. Although it forms the basis for modern goods classification and trade area theory, the assumption of comparison

and rational calculation is not supported empirically and, in fact, is contradicted by a growing body of evidence (Mueller and Katona, 1955; Holton, 1959; Luck, 1959; Cunningham, 1961; Tate, 1961; Alderson and Sessions, 1962; Udell, 1966; Feldman, 1967; Mason and Mayer, 1970a; Mason and Moore, 1970-1).

The foundations for a theory of rational customer calculation are weak. In a sense calculation is a mathematical, rather than a behavioral, concept which fails to distinguish between significantly different dimensions of problem-solving behavior (Wilding, 1968, p. 145; Wilding and Bauer, 1968). Certainly the existence of risk (Bauer, 1960) casts doubt on the inherent superiority of maximizing strategies over risk minimization or acceptance as the basis for rational action (Myers and Reynolds, 1967, p. 101; Popielarz, 1967, p. 371; Barach, 1968, p. 141). Since no one customer strategy has clearly been designated as rational in marketing theory, a number of different decision orientations (Nehnevajsa, 1966) may be termed rational. Actually, the tendency to assume customers to be rational reflects the failure of marketing theory to reach a compromise between economic and behavioral science viewpoints (Udell, 1964-5; Nicosia, 1966, p. 38). Since problem solving behavior is a relatively rare phenomena and since any link between rationality and maximization produces little more than a tautology (Katona, 1953; Myers and Reynolds, 1967, p. 50) i.e., it is impossible to present a situation contradicting it, this path of inquiry seems conceptually sterile.

It would seem proper to conclude that the present state of knowledge concerning the effect and nature of the urban environment prohibits the treatment of customer environmental experience solely in terms of simple costs and satisfactions. Attention must be devoted to the character of environmental experience. The heterogeneity of ego-centered and environmental variables suggests that this experience be examined in terms of its objective and phenomenological character.

The adoption of such a dual definition of the relevant environmental situation prevents the reciprocity criteria from reducing a model of environmental behavior to a theory of retail development and institutional change. It thus becomes possible to speak of changes in environmental characteristics which could otherwise only occur over time. This prevents reciprocity from being transformed into a concept of retail institutional adaptation. The changes in the retail structure, referred to by the reciprocity concept, are a potential source of institutional change but are themselves limited to modified perception. This aspect of reciprocity presents an extension of the restructuring process in a topographical model of consumer space preference (Huff, 1960, p. 164).

Contextual and Stimulus Properties of the Environment

The dynamic customer-environment interchange influences environmental response by providing a behavioral

context and stimuli which have either a direct impact or generate long-term residual effects (Kates and Wohlwill, 1966; Wohlwill, 1970).

All behavior occurs within some physical context but its objective and symbolic character, as suggested by the dual definition, make that context far from obvious. The customer himself may be unaware of the physical context within which he acts. Thus the surroundings may appear neutral and enter awareness only when they deviate from some adaption level (Proshansky, Ittelson, and Rivlin, 1970c, pp. 36-7). Yet studies involving so-called behavioral settings, and including retail stores, reveal that certain kinds of behavior are localized in certain types of settings. People seem to learn to act in a particular manner in particular settings (Barker, 1963, 1968). In this limited sense the environmental characteristics of a retail store possess meaning as a behavioral context.

This, however, is too narrow a view of contextual properties. As noted previously it is dangerous to abstract the retail environmental component from the relevant urban environmental system (Proshansky, Ittelson, and Rivlin, 1970c, p. 34). To do so is to invest the store environment with contextual qualities which it does not possess and thus to give the retail environment greater reality than the environmental situation from which it has been abstracted. The error of this procedure would be seen by the hypothetical placement of identical retail units in different parts of

the same city or in different cities and then the observation of the behavior of the same customers in each context.

While such data is not available, existing information does imply that customers relate to the total environment that is personally relevant, including the environment surrounding the behavioral setting of a retail element (Feldman and Star, 1971). Theoretically this is an example of the proposition that the environmental setting which defines a given behavioral context is not a closed system. Its boundaries are not fixed in time or physical space (Proshansky, Ittelson and Rivlin, 1970c, p. 31), but in the mind of the customer.

A central feature of urban environmental research is the effort to relate objective stimulus properties, their perceptual manifestations, and the stimulus properties of the symbolic environment. Such information is a prerequisite for intelligent urban planning yet, to the extent that the urban environment has been studied at all, only certain objective stimulus properties have been traditionally examined (Kates, 1966, pp. 23-4; Kates and Wohlwill, 1966, p. 15). Thus both planning needs and the requirement for a two-faceted environmental definition suggest the need to expand this research perspective and develop a framework to define the categories of environmental stimulation.

The motivational properties of environmental stimulation can be specified in terms of behavior instigated by

and directed at particular environmental characteristics (Wohlwill, 1970).

The proximal impact of environmental stimuli can be seen in their role as sources of affect and attitude and approach and avoidance response.

As a source of affect and attitude the environment is functionally related to buyer predispositions. There is growing support for the thesis that physical settings are closely related to attitudinal and value systems, expectancies, general affect, exploratory drive, and curiosity (Parr, 1966, p. 42; Fatouros, 1968, p. 520; Proshansky, Ittelson, and Rivlin, 1970c, p. 28). In addition, urban environments have been alternatively characterized as scenes of sensory deprivation and overstimulation and stress (Wolpert, 1966). The distinction is especially important when considered in terms of the attitudinal and affective consequences of stimulus variation. Causative direction has been difficult to establish in matters of urban stimulation. Opposing views exist with respect to whether an urban customer is alert because he is experiencing less strain from environmental stimuli or whether he experiences less strain because he is alert (D. H. K. Lee, 1966, p. 85). In any case a lower degree of strain and alertness are somehow linked and tend to influence a broad range of intellectual activities, including choice behavior. A definite answer in this monotony-understimulation, complexity-overstimulation debate would require the isolation of the relevant stimulus input

variables. Certainly the intricacies of environmental stimulation can involve the coexistence of monotony and complexity. Thus the physical design of a shopping area may lack stimulus value or stimulus variation while the sights and sounds of human and vehicular movement may, as intense and complex stimuli, be sources of stress (Kates and Wohlwill, 1966, p. 16; Rapoport and Kantor, 1967). Still, principles derived from experimental research on the motivating effects of stimulation suggest the existence of an optimal level of stimulation (Wohlwill, 1966), defined in terms of customer behavior with respect to that shopping area.

While the magnitude and directional influence of stimulus variables remain matters for future research, general functional linkages are being established. There are indications, for example, that changes in urban environment produce significant modifications in individual value systems and attitudes with respect to object, particularly goods, orientations as well as the nature of prepurchase decision processes (Michelson, 1970, p. 141).

The concept of optimal levels of environmental stimulation suggests environmental attributes play a role as sources approach and avoidance response. At the very minimum this provides a basis for judging avoidance behavior as the joint product of monotony and overcomplexity (Kates and Wohlwill, 1966, p. 16). In more general terms, external search propensities and customer spatial extensivity can be

seen to be related to the design of retail facilities and the paths leading to them and not merely to the character of merchandise offerings. These parameters of environmental behavior are typically assumed as being identical by gravity models (Huff, 1962a, p. 65) and are totally ignored in goods typologies. Concern with these matters in trade area and location analysis (Applebaum and Cohen, 1961) and store layout (Gist, 1968, pp. 231-52; for two unusual approaches see Krugman, 1960, and Winkel and Sasanoff, 1970) literature is usually limited to isolated observations and lacking in theoretical underpinnings.

Actually, customer spatial patterns are related to the total relevant environmental situation, with goods and service mixes acting as only one of a set of influential variables. Thus the number and distribution of retail facilities is related not merely to the character of customer spatial movements (Yuill, 1967, p. 107) but perhaps also to their speed and direction (Parr, 1966, p. 143). In this manner the correlates of multipurpose trips and the observation of accelerated movement in the direction of a diminishing visual inventory can be given greater significance than that of mere isolated relationships by placing them within the confines of a customer environmental behavior model and studying them as approach-avoidance phenomena.

Approach and avoidance may not be the direct behavioral counterparts of summed positive and negative valences associated with a set of alternative environmental experiences.

A mechanism may operate to allow the customer to cope with environmental disamenities and a disamenity threshold, which must be exceeded before the stressful consequences of negative environmental features escalate into strain, may tend to filter the results of environmental experience. Thus a moderate degree of stress may induce search behavior just as uncertainty without anxiety may be associated with productive work (Wasson, Sturdivant and McConaughy, 1968, pp. 35-6; Wolpert, 1966, pp. 94-5).

Affect and attitude and approach and avoidance tendencies can manifest themselves in the present states and overt behavior without immediately, or ever, percipitating any significant behavioral consequences (Parr, 1966, p. 42). Of course, it is possible that exposure to more variable environments results in customers who are more perceptually alert and behaviorally active, that urban monotony produces the effects of long-term sensory deprivation, that perception of the urban landscape is primarily a function of extended exposure to habituated environmental constants, etc.

These and other distal responses to environmental stimulation are the result of processes of adaptation or adjustment. As a seeker and neutralizer of environmental stimulation, the customer employs various physiological and psychological adaption processes (D. H. K. Lee, 1966, p. 87), which, for example, may help neutralize and surmount the barrier properties of a path to a shopping alternative.

Incomplete neutralization, adjusted for acceptable deviation from an adaption level (Wohlwill, 1968-1970), may escalate into strain (Wolpert, 1966), yield an avoidance response, and, over time, produce permanent modifications in spatial choice processes and habits (Gist, 1968, p. 169).

Alternatively, a form of dynamic adjustment through technology is possible. Thus the customer traveling in a quiet, air conditioned vehicle has not adapted to the sounds, odor, heat and humidity. Instead technological adjustment has reduced the stress on the customer's adaption processes. On the other hand, adaptation on the part of a customer who must face such urban elements without a technological shield may leave a detectable behavioral residue, possibly in the form of altered arousal thresholds, frustration tolerance, physical discrimination abilities (Wohlwill, 1966, p. 36), etc., which characterize behavior across a constellation of roles, including those associated with customer behavior.

Similar adaptation and adjustment processes can result in a group of customers becoming, to a large extent, commonly conditioned to environmental factors. Sharing certain expectancies, these so-called natives accept and even positively value environmental features that may be regarded as otherwise by non-natives, i.e. the new or visiting customers and those, who despite their presence in the same physical environment, share a different set of environmental experiences and expectations (Kates and Wohlwill, 1966, p. 17;

Sonnenfeld, 1966). In marketing literature non-native learning processes have been considered chiefly in terms of brand behavior (Atkin, 1966; Halbert, 1966; Andreasen and Durkson, 1968).

Yet, in spite of the proclivity of marketing theorists to neglect their existence, it would seem that the stimulus properties of the urban environment function prosthetically to support behavior goals, through the maintenance of behaviorally correlated physiological states, and elicit stimulus influence over certain behavioral topographies (Michelson, 1970, p. 26; Studer, 1970, p. 58). Environmental stimulation enters discussions of retail theory in the form of consideration of the proximate effects of store design (Krugman, 1960; Engel, Kollat, and Blackwell, 1968, pp. 474-99; Gist, 1968, pp. 231-50; Winkel and Sasanoff, 1970). There is an absence of speculation concerning the long-term behavioral effects of changes in urban retail structure or internal features of retail facilities. These are vital considerations in evaluating alternative urban plans and in predicting the consequences of urban growth and change.

Ironically, the most systematic treatment of the stimulus effects of the retail element and its urban setting are to be found in gravity and trade area approaches. Even here, however, such relationships are implied rather than explicitly treated. This is understandable insofar as retail gravity is an empirical concept, devoid of behavioral foundations and internal theoretical cohesion. Gravity statements,

after all, are neither laws nor theories but rather historical accidents produced by methods designed for short-cut approximation of the direction and magnitude of travel movement (Isard, 1960, p. 566; Huff, 1962a, p. 65; Goldstucker, 1965; Moore and Mayer, 1966; D. L. Thompson, 1966, pp. 5-6; Scott, 1970, p. 180). It is also understandable insofar as trade area analysis, hampered by a preoccupation with unexplained aggregated statistical regularities and crude boundary estimation, is remarkably free of theoretical considerations. Trade area analysis, after all, has thrived on a steady diet of descriptive studies of site accessibility, traffic flow, extent of patronage, composition and distribution of population, income and economic stability, and existing and potential competition and erroneously transformed retail demand, profit and location into sequential considerations (D. L. Thompson, 1966, pp. 6, 11-12; P. T. Nelson, 1970).

Concentrating on the effects, rather than the nature of environmental stimulation, gravity and trade area students have shared in a search for spatial equilibrium solutions. Such efforts have influenced the development of retail analysis by presenting the possibility of a unique objectively derived solution acting as a terminating point for some undefined iterative customer process. Such a solution has meaning in marketing and urban design in that it contributes to the construction of meaningful theoretical and physical spatial systems (Golledge, 1970, p. 417).

The notion of equilibrium involves a balance of forces producing a stable state in a system. General behavioral equilibrium involves homeostasis and, within limits, repetitive and invariant behavior. Thus there is no net change in behavior between successive periods of observation. Environmental or spatial equilibrium is merely a special case of general behavioral equilibrium. Like its counterparts in other behavioral subsystems, environmental or spatial equilibrium can only be subjectively defined in terms of arbitrary time slices and with respect to a braoder behavioral model (Golledge, 1970, p. 417).

This is evident if customer spatial equilibrium is derived from the corresponding general equilibrium states inherent in Kotler's (Kotler, 1965) alternative models of consumer behavior. Thus the spatial equilibrium corresponding to the Marshallian model would be represented by an arrangement of discrete market areas while the Pavlovian variety would reflect stimulus prone, habitual spatial tendencies of a stereotyped, rigid and repetitive nature (Golledge and Brown, 1967; Golledge, 1970, p. 418). A socially determined customer spatial equilibrium can be derived from the Veblenian model but it lacks an a priori spatial character. Only in the case of the Freudian model, which involves only short-term regularities in spatial behavior, is it impossible to define behavioral, and thus to derive any spatial, equilibrium (Golledge, 1970, p. 418).

In a somewhat less systematic fashion, spatial equilibrium states can also be derived from assumed customer characteristics. In this fashion, cognitive dissonance (Festinger, 1957) can be used to develop an equilibrium patronage pattern which would minimize the dissonant feeling following customer environmental response, in a manner similar to the minimum regret of game theory. A presumed characteristic of spatial rationality, on the other hand, would provide for choice of least effort or minimum aggregate distance paths. The customer would move down a heirarchy of route preferences as barriers presented themselves. Customer environmental response would involve a variety of transport modes but invariable rational path selection because patronized retail elements would be those seen as nearest or involving least effort. Equilibrium would be disturbed only as additional information prompted attempts to eliminate spatially irrational acts. Equilibrium itself might involve least effort principles, single choice syndromes, or habitual multiple patronage (Golledge, 1970, pp. 418-9).

Obviously equilibrium states based on a single customer characteristic are analytically deficient insofar as they lack the foundation provided by the explicit morphology and behavioral mechanisms of a general model of consumer behavior. Thus they are theoretically barren, except in terms of comparative statics, and essentially tautological.

They share these characteristics with most mathematical models of customer spatial equilibrium.

Such models fall into place-loyalty, market share, learning and stochastic perceptual categories.

In place-loyalty models consumers, assumed to be scattered in space, develop habitual preferences resulting in their patronizing one retail place to the exclusion of all others. Generally economic and spatial rationality characterize behavior and least effort tendencies operate, with effort measured by increments to the base price of goods resulting from movement. This form of spatial equilibrium output can also be derived from central place, gravity, and retail location models (Carrothers, 1956; Huff, 1964; B. J. L. Berry, 1968).

The deterministic framework, the permanent allocation of customers to discrete retail nodes and the finite boundaries to areas of nodal dominance typically found in such models directly conflict with empirical evidence of customer behavior (Rushton, Golledge, and Brown, 1965; Golledge and Brown, 1967, p. 116; Enis and Paul, 1970). In single vector and Markov variations of market share models (Golledge, 1970, pp. 419-20), however, explicit recognition is given to possibility of customer uncertainty and response change occurring in an equilibrium situation. As a result, probability distributions are used to specify patronage proportions over retail alternatives. Frequency of patronage can be variously established by studying the frequency of individual patronage,

averaging the proportion of times which group members patronize retail places, or employing store characteristics as surrogate indicators. In simple models the equilibrium output is represented by a constant probability vector. Huff's (Huff, 1962b, 1963, 1964, 1966) construct is one example of single-vector market share models.

Although such models seem consistent with the probabilistic nature of customer environmental behavior, they do not specify how the market-sharing principle was established. Since vector elements are usually based on cross-sectional data, we have the paradox of an equilibrium solution provided without evidence that consumers are in equilibrium.

Markov variations help reduce the first of these objections by assuming patronage is based on habit rather than conscious preference behavior. Initial behavior is thought to be modified by the rewards associated with trial and error, i.e., the strengthening of rewarded responses and the extinction of non-rewarded efforts. While this series of events might be represented by a single-vector model subject to changes through time, the more general form is a first-order Markov model which describes the equilibrium state by stable-state proportions. Customer switching and staying tendencies are summarized in a matrix of transition probabilities. Thus the equilibrium state evolves from an initial patronage configuration. The operation of this model, by emphasizing the effect of last patronage on next patronage probability, captures certain facets of the role of learning and experience in producing spatial equilibrium.

The relationship between learning and spatial equilibrium is given explicit consideration in linear operator learning models (Golledge, 1970, pp. 420-2). One-element models treat reward and nonreward as having an equal effect on patronage. Using a first-order difference equation, this model depicts a customer's store choice as being equal to the probability of that choice in the last period plus an increment proportion to the maximum possible increase in patronage probability. Such models employ empirical or Bayesean estimates of last period patronage, an assumption that patronage is a function of the number of reinforcing experiences, and a learning parameter that determines the rate of approach to an asymptotic equilibrium state.

The more comprehensive two-element models treat reward and nonreward as having different effects on patronage and use two learning parameters to describe the rate at which patronage probability is incremented or diminished by store choice or rejection. On the assumption that learning is always incomplete, these models provide for upper and lower asymptotic patronage limits.

The problem of numerous retail alternatives and the distribution of decreased patronage can be handled by using vectors specifying asymptotic patronage limits for each feasible place in an n-operator model. Unfortunately, the myopic concern with past choice prevents a consideration of the total marketing efforts of different retailers and their effects on patronage. The most important defect is that

patronage, regardless of its consequences, always increases the selection habit and only nonpatronage tends to limit habit formation (Kotler, 1968, pp. 281-2; Golledge, 1970, pp. 421-2).

There remain, however, fundamental questions as to the validity of the concept of patronage equilibrium. It is obvious that exclusive patronage is hopelessly inadequate as a description of customer spatial equilibrium. Yet it may also be that observed customer microgeographic variability invalidates concepts of individual patronage equilibrium tendencies as well as spatially competitive equilibrium between retailers (Mason and Moore, 1970-1, pp. 36-7). One need not adopt this extreme position to recognize that customer spatial equilibrium patterns are not immediately determinate. Certainly search and shopping tendencies form the basis for a customer's eventual system of optimal spatial connections. The duration of pre-equilibrium activities is a function of goods and store type and frequency of purchase and visit. It may be that in some cases this period of non-optimal spatial connection may never end (Berry and Garrison, 1958b, pp. 119-20) while in other instances the dynamics of retail competition and urban change result in short-lived equilibrium states.

There is clearly a need in marketing for theory concerning non-equilibrium states and the associated perceptual processes which influence customer movement. At present the temporary character of urban patronage equilibrium is best

captured by stochastic perceptual models (Golledge, 1970, pp. 422-3). These models employ the product of a response vector, containing the relative ratings of salient retail attributes, and a rating scale matrix, containing store ratings along salient attribute dimensions, as an index of patronage probabilities. Although the use of normalized average perceptions limits these models to aggregate application, such a scale problem is not insurmountable. What is crucial is that these models explicitly handle the influence of temporal variations in marketing mix inputs and provide for only temporary equilibrium states. The integration of the insights provided by stochastic perceptual models into a framework which comprehends the contextual and stimulus properties of the urban environment would have several advantages. First it would allow marketing theory to focus on nonequilibrium customer processes and behavior. This provides a basis for the analysis of nonequilibrium spatial systems in urban planning. Second, this integration would relieve customer behavior constructs of their deterministic character by transforming patronage equilibrium from an assumption and a matter of eventual fact into one of a number of testable propositions. Third, it would free retail theory of the shackles of environmental neutralism fashioned in an era concerned with rural, not urban, commerce. Finally, it would be theoretically parsimonious in that it allows us to avoid the useless complexity required in models based on behavioral, spatial, and physical determinism.

A Four-Element Intersystem Congruence Model

The four previous requirements for a model of environmental behavior suggest the existence of four essential elements. There is an individual decision maker (the customer), whose environmental response behavior (path and store choice) is a function of an environmental situation (which includes, but is not limited to, store environment) and an environmental decision process (Blaut, 1969, pp. 1-9; R. M. Downs, 1970).

Reciprocity (between the customer and the environmental situation) provides the environmental decision process with a dynamic and evolving character. The dual definition of the environmental situation suggests that environmental perception is a major parameter in the customer-environment interchange and thus in the environmental decision process. Together with the contextual and stimulus properties of the urban matrix, environmental perception forms the behavioral basis for path and store choice, i.e. customer environmental response. This suggests the existence of three sets of feedback loops. Primary feedback involves the consequences of continual interaction with, and redefinition of, the urban environment. Secondary feedback involves the stored consequences of current environmental response. Tertiary feedback involves residual effects of cumulative environmental responses and experiences.

In this context it becomes apparent that the descriptive heuristics of gravity-based projections of customer

spatial behavior form an inadequate basis for a theory of customer environmental behavior. It is also plain that attempts to show up such theoretical deficiencies, by employing assumptions of customer behavioral tendencies derived from an economic man concept, have amounted to a normative prescriptive explanation of customer environmental behavior leading to a mechanistic pairing of customers with retail facilities (R. M. Downs, 1970, p. 14).

A distinguishing characteristic of a customer environmental behavior model is the explicit recognition of the fact that the bonds between urban activities are so pronounced and exert such an integrating effect that retail and customer spatial analysis must treat these activities as bound together in an urban complex, rather than separately (Isard, 1960, pp. 673-4; A. Mayer, 1967; Schnore and Lampard, 1967, p. 24). Thus the model's four criteria as well as its essential elements present the consumer as relating and reacting to the structure of the psychologically relevant urban environment rather than to isolated stores or other individual physical elements.

An examination of the character of this relationship provides the theoretical frame necessary to conceptually link the model's elements. Earlier consideration of implications of the model's first four criteria suggested the rejection of both environmental (spatial) determinism and dominance by non-physical (cultural, social, and psychological) systems. A long tradition of non-physical system

dominance in social science theory and research has served to indicate that this view is barren of environmental consideration and, for our purposes, theoretically sterile.

Environmental determinism would suggest that customer environmental response is determined by the arrangement of urban physical space. Research dealing with other role types and behavior subsystems lends initial support, by inference, to this contention. Closer inspection, however, reveals that perceived, induced, or actual homogeneity of residents is often responsible for common response patterns. Even these similarities tend to diminish as time passes (Heyman, 1964; Michelson, 1970, pp. 168-90), indicating that learning and adjustment processes modify apparent determinism. In these cases as well as those involving customer behavior, environmental determinism tends to factor out the significant processes of environmental decision making. Thus it is necessary to distinguish between determinism and influence.

Certainly, an analysis of the customer-environment relationship should recognize that certain "states of variables in one system can coexist better with states of variables in another system than with alternative states"[6] (Michelson, 1970, pp. 25-6). When examples of such congruence

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[6]The congruence concept suggests that different psychosocial characteristics of urban residents are consistent with different urban physical systems, i.e., they tend to coexist better with certain physical arrangements than with other variations of the urban matrix.

are found with respect to customer environmental behavior and analyzed in terms of the previously established criteria and elements, we have developed the basis for an intersystems congruence model (Michelson, 1970, pp. 25-30). This model would suggest the broad limits within which customer cultural, social and psychological characteristics and urban environmental features systematically articulate with one another.

Congruence is consistent with requirements for environmental definition because it allows customer variability and choice to operate within the limits of differential perception without ruling out the basic relationship, between the urban physical system and customer non-physical systems, imposed by the environment. Thus it is possible to observe how particular retail structures within urban environments articulate with customer values, attitudes, and spatial tendencies. Certainly any mismatch or incongruence may be properly maintained despite its dysfunctional nature because intermediate variables intervene or because it is the result of more functional relations (Alexander, 1970; Haythorn, 1970). The concept is used to convey the idea that potential customer spatial diversity is constrained by the limitation of not only common cultural, social, or psychological characteristics but by existing or future urban form (Carr, 1970, p. 521; Michelson, 1970, pp. 24-6; Studer, 1970).

An intersystem congruence model will facilitate the organization of relevant variables in designed urban

environments in accordance with specified behavioral requisites. The range of such alternative spatial outcomes has been generally disregarded in planning research. The pertinent question now is not the relative importance of designed retail or urban environments but rather whether different plans for an urban area and its retail structure result in corresponding differences in customer behavior (Gutman, 1966, p. 113; Stagner, 1970, p. 197).

The design of the retail structure or any other urban physical subsystem cannot, however, be automatically linked to time- and space-bound precepts of future users. A distinction must be drawn between mental and experiental congruence. Mental congruence is essentially expectational and involves beliefs concerning the ability of a spatial pattern to accomodate a characteristic mode of environmental behavior (Michelson, 1970, pp. 30-1, 204-6). Studies of mental congruence seek to discover, for example, what customers want in terms of the spatial character of retail facilities and why these features seem desirable. Thus they are limited to uncovering regularities in expectations regarding consequences arising from the creation or maintenance of a particular physical environment. Results are further qualified because responses are a function of existing environmental alternatives and limited customer environmental experience (Carr, 1970, p. 521). Experiential congruence, while also related to expectations (Sonnenfeld, 1966; Wolpert, 1966; Michelson, 1970, p. 30), involves actual behavior

and how well an environment accomodates actual characteristics and behavior of users (Michelson, 1970, pp. 31-3, 206-13). Customers may not be aware of the existence of experiental congruence, but their actual experiences can indicate the constraining or enabling influences of their urban and retail environment.

The congruence concept is the product of a realistic interpretation of the inherent limitations of urban environmental research. The concept is fashioned to cope with otherwise inconclusive results of studies which find it impossible at any single moment to measure the impact of the total environment (Dyckman, 1961). Design, by its nature, involves the simultaneous and sequential combination of many elements to form a total urban system. The task is complicated by the probable nonlinear, discontinuous relationship among variables in the urban system and between these variables and the values of any objective function. Given the possibility of developing new design elements and the existence of relatively few external constraints, the solution space for the design of an urban system has undefined dimensions which prevent the total analytic treatment of the planning process to reach a true optimum result (Harris, 1967). The best hope is for suboptimal urban environments in which desirable adaptive behavior is made possible by intersystem congruence.

Given even linear functions, existing technology, and a suitable number of constraints, the specification of

optimal urban environmental conditions remains impossible (Proshansky, Ittelson, and Rivlin, 1970b, p. 278, 1970c, p. 494). The current level of theoretical development and empirical ignorance does not allow us to deal with conflicting behavioral goals or even specify the role and functions of an urban retail structure (Duhl, 1963, pp. 139-40; Gutman, 1966, p. 111). Thus a retail or total servo-environment composed of behavior-contingent subsystems will remain an ideal (Sommer, 1969, pp. 145-54; Alexander, 1970; Studer, 1970).

It is possible to distinguish between environmental characteristics which facilitate and obstruct various behavioral goals. The congruence concept provides a suitable vehicle for such analysis while acting as a safeguard against the adoption of restricted causal chains or functional relationships which link particular physical stimuli to particular environmental responses (Kates and Wohlwill, 1966).

The limitation created by focusing on the retail elements in the urban system and on the customer role type may appear artificial. Yet a holistic vision of the urban environment should not produce futile attempts at holistic management. The feasible approach is through general systems theory which, like _ad hoc_ methods, deals with elements and subsystems, but unlike the _ad hoc_ approach deals with them, as much as possible, in relation to the total system of which they are interrelating components (Caldwell, 1970, p. 75).

This approach provides the basis for intelligent environmental analysis and choice. It does not provide a means to design self-maintaining urban retail environments. Recent planning experience has made it evident that environmental intervention increases, rather than diminishes, the need for environmental management (Willmott, 1967, p. 396; Willis, 1969, p. 189). Administrative necessity is underscored by the dynamic properties of congruence, the suboptimal nature of urban design, and the need to provide for future accomodations. The potential insights provided by an intersystem congruence model have a value content which is independent of political and economic context (Applebaum, 1965). Even unlikely retreat into policy neutralism or avowed pluralism, two complementary anti-planning positions (Erber, 1970, p. xv), will not diminish the value of increased understanding of customer environmental behavior.

CHAPTER II

A THEORY OF CUSTOMER ENVIRONMENTAL PERCEPTION

The previous analysis suggests that there are factors outside the urban retail spatial system, i.e., the number and type of retail facilities and their spatial distribution, which influence customer environmental behavior. To understand how customer environmental behavior is related to the urban retail spatial system and to explore the consequences of differential spatial organization, we must avoid the assumption that the identity and relatedness of retail elements can be derived from a total concentration on urban arterial networks. Instead we must acknowledge that the space within which urban residents carry out their daily activities is not merely defined by the physical barriers which restrict motion and/or the reception of urban stimuli. Urban space is also defined by the behavior of individuals who occupy that space (Lynch and Rivkin, 1959; Duhl, 1963; Stea, 1965). Conventional investigations of the man-environment interchange have paid insufficient attention to the human side of the equation. A review of past research reveals that models based on vaguely defined assumptions of rationality or focusing on objective pushes,

pulls, and opportunities fail to explain a considerable portion of the variation in environmental response.

As Stea and Downs (Stea and Downs, 1970, p. 5) have noted, it is this unexplained behavioral variation, which was once attributed to so-called irrational forces and considered to be the noise of earlier research, which now becomes the signal or subject matter in the current study of environmental behavior. The basis for this research knowledge lies in an understanding of how urban residents (in our case, customers) comprehend the urban environment, i.e. interpret the physical and nonphysical nature of the surrounding spatial field. The transactions between the customer and this field (as defined by the reciprocity concept) are a function of configurations of stimulus and contextual properties of the urban environment (as defined by the dual definition concept) as they are distributed in space (Beck, 1970, pp. 134-5).

It is dangerous to assume that the space within which customers move has entirely objective geometric properties. The distinct difference in meaning between various urban areas (T. Lee, 1968; Carr, 1970; Strauss, 1970) and directions (Kepes, 1961; T. Lee, 1968, 1970; Lowrey, 1970) give urban space a nonhomogeneous character (Kepes, 1961; Iatridis, 1966; DeJonge, 1967-8, p. 10; Horton and Reynolds, 1969). These differences are compounded by significant variations in the manner in which different urban groups comprehend and use their environmental surroundings (Fried and Gleicher,

1961; Duhl, 1963; Webber, 1964; Beck, 1970; Strauss, 1970). Unfortunately, the observation of such variation has not been accompanied by the identification of those variables which link environmental comprehension to behavior. This restricts our ability to describe the nature of the environmental decision process which underlies customer environmental behavior.

Thus in present exploratory research efforts it is both necessary and desirable to focus on the subjective basis of the environmental decision process, urban environmental perception, and, in Carr's (Carr, 1970) terminology, to attempt to understand the "city of the mind." Certainly the ability to eventually develop a model capable of capturing the results of customer environmental choice depends on an understanding of how the objective urban landscape is subjectively interpreted by the customer (D. L. Thompson, 1966, p. 9).

Purpose

The purpose of the present research effort is to develop an exploratory model in order to define, study, and measure customer environmental maps, i.e. the conceptual or imaged space which represents a customer's understanding of his urban retail environment. In order to develop the framework for such a tentative model, it is necessary to review some of the attempts to investigate the mental maps[1] of

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[1]Impressions of large physical areas and urban areas have variously been referred to as mental maps, cognitive maps, schemata, conceptual spaces, and imaged spaces.

urban residents so that we may develop assumptions regarding the special nature of customer environmental perception and outline some of the principles which customers use in ordering retail conceptual space. We will then discuss the nature of customer environmental perception and some of the functions of customer environmental maps and contrast certain key notions with earlier psychological research. Using customer environmental maps as a theoretical construct and experimental output mode, we shall discuss the nature of relevant metrics and develop a summary statement and definition of customer environmental maps. It will then be possible to develop certain testable hypotheses. Hopefully this effort will contribute to our understanding of the customer environmental decision process and thus to the intelligent planning of urban retail facilities.

Related Research

The current interest in urban imagery and maps as perceptual phenomena can be traced to the pioneering research of Lynch (Lynch, 1960), who employed the concept of an image as a cognitive representation of a large urban physical area. Although the image concept had earlier applications, its use in an urban setting was both new and significant, especially since, as shown below, it involved an important departure from the limited setting of conventional psychological studies of the perception of stimuli. In studying the comprehension of the city-scape by residents of Boston,

Los Angeles, and Jersey City, Lynch, as a planner, was primarily interested in uncovering the relationship between respondents' urban images and the actual physical form of the city. Comparing consensual urban images to visual reality, Lynch sought to offer principles for urban design. Using respondent's map sketches and verbal responses, Lynch constructed the urban images or maps which residents seemed to employ in their daily decision processes. These maps revealed important differences in the manner in which residents organized city dimensions and images and significant alterations and deletions of urban landmarks, districts, and travel routes. Subsequent applications of Lynch's methodology in other urban settings (DeJonge, 1962; Gulick, 1963; Appleyard, 1969, 1970; Porteus, 1971) have substantiated his major conclusions and extended knowledge concerning the comprehension of an urban matrix in terms of both image formation and image structure. As Thompson (D. L. Thompson, 1966) has observed, Lynch's seminal efforts have important implications for marketing theorists because an insight into the subjective reactions of residents to urban environmental complexity may carry important clues for analyzing shopping behavior and the spatial distribution of patronage.

Another development in the study of urban imagery is the investigation of how cognitive representations of the urban environment are formed. In this connection a concern with what people look at as they move through the city, how they remember such contacts, and how they use their memory

in reconstructing that experience (as they might in carrying out daily activities) has spurred an interest in the cognitive mapping processes associated with the experience of moving through the city on an expressway as a driver, occupant, or commuter. The findings of Appleyard, Lynch and Myer (Appleyard, Lynch and Myer, 1964) and Carr and Schissler (Carr and Schissler, 1969) in this area have helped uncover the primary perceptions of an urban highway sequence, the sensations of space and motion, and the most readily identifiable elements of attention in such situations. Although primary interest has centered on the psychological effects of urban highway design, this literature carries important implications for marketing analysts interested in the perception and memory representation of such trips as they relate to expectations and patterns of looking. These studies have focused on the roles of such variables in organizing and transforming sequential trip perceptions into cognitive environmental representations.

A third body of related research has arisen in connection with the developing interest in the duality of the physical and nonphysical neighborhood. Studies eliciting phenomenological representations of urban neighborhoods (T. Lee, 1966, 1968; Willmott, 1967; Ladd, 1970) have employed these outputs as primary indicators of the social and psychological contents of neighborhoods and, indirectly, of the limited nature of individual action spaces. Although their methodology and objectives have differed, neighborhood

mapping studies have shared three common features. First, they have provided indications of the potential information value of maps as inputs in the urban planning process. Second, they have helped to reveal sources of individual and group variation in phenomenological representations of urban space. Finally, they have contributed to knowledge concerning environmental perception by providing insights into the cognitive processes involved in the comprehension, organization, and representation of an urban area.

The general theoretical foundation for a model containing these and other aspects of urban images or maps lies in understanding of the psychological basis of space perception and the learning processes involved in environmental interaction (Harvey, 1969a, pp. 192-7). While definite conclusions are not at hand, recent concern about these basic matters has led to empirical studies and scientific speculation (Shelton, 1967; Tilly, 1967; Steinitz, 1968; Blaut, 1969; Blaut, McCleary, and Blaut, 1970; Ladd, 1970). It would seem that mapping processes are an important component in environmental learning. It would also appear that images or maps of urban areas are not isolated phenomena but are directly related to the observed ability in children to generate, represent, and utilize cognitive maps of more limited spatial environments.

An Exploratory Model for the Measurement of Customer Environmental Maps

While the previous literature does not directly deal with customer environmental behavior, it does provide clues as to the possible variables and mechanisms involved in the urban environmental perception of customers. Such perception is regarded here as a set of micro-geographic perceptual experiences which are used by customers to form a macro-environmental strategy of behavior (Blaut, McCleary, and Blaut, 1970, p. 337). At present the most important priority is to develop a conceptual framework to link the variables and mechanisms in question and to provide a guide for future research. A useful reference in this connection is Stea's (Stea, 1969) experimental model for studying the mental maps and conceptual spaces associated with the perception of large physical environments. Stea's model, the product of older psychological research and recent findings concerning environmental perception, is intended to serve as a guide for organizing experimental research. The model is neither urban in orientation nor readily applicable to customer behavior.[2] The present objective is to modify the Stea model, in terms of the general model of environmental behavior and insights provided by research in psychology, sociology, behavioral geography, and customer behavior, in order to develop a new

[2] Stea (1965) has applied the mental map concept to more limited contexts, suggesting that different mental map models can be developed for different environmental settings.

construct suited to the study of the environmental perception of urban customers.

Basic Assumptions

Initially it is necessary to make the three following assumptions.

First, customers form conceptions of significant portions of the urban display or objective urban environment, that are too large to be perceived or apprehended at once. The retail component of the urban display is the total retail store set (TRSS), which contains all retail alternatives. For any expected pattern of customer behavior there is an existing group of retail alternatives, the retail store subset (RSS).[3] Taken together, all RSS's are collectively exhaustive, but not mutually exclusive, subsets of the TRSS.

Second, customer conceptions of the objective urban retail environment contain two basic categories of retail elements.[4] There are, first of all, those retail elements in the objective urban landscape of which the customer is aware, the total comprehended retail store set (TCRSS).

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[3] An expected pattern of behavior refers to a customer's expectations regarding the character (instrumental versus congenial) and nature (purchase versus search) of a forthcoming trip. (See Alderson, 1965, pp. 144-51.)

[4] The term element refers to the fact that, in a customer's conception of urban retail reality, retail alternatives are conceived as macroenvironmental information categories, i.e. cognitive categories into which information about the retail spatial system is coded (see Stea and Downs, 1970, p. 8).

For any expected pattern of customer behavior there is a corresponding group of potential retail elements of which the customer is aware, the comprehended retail store subset (CRSS). Since a customer may be aware of a retail element yet not consider it to be an acceptable alternative, CRSS's, taken together, are neither collectively exhaustive nor mutually exclusive subsets of the TCRSS.[5] A second category, the total evoked store set (TESS), contains the elements in the urban retail landscape which the customer considers as alternatives for all his expected patterns of behavior. For each expected pattern of behavior there is a corresponding subset of acceptable retail elements, the evoked store subset (ESS). Taken together, a customer's ESS's are collectively exhaustive, but not mutually exclusive, subsets of the TESS.

Third, the customer's conception of the urban retail landscape, which contains the aforementioned retail elements, may not be spatial but, by means of certain mechanisms, orders retail elements, which are themselves spatial entities.

Ordering Mechanisms

While the exact nature of these ordering mechanisms is not known, it is possible to suggest certain principles

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[5]Since a retail facility can operate as a landmark, orientation reference, etc., a customer may be aware of the physical existence of a retail facility but not its functional nature as a retail unit. Such a facility would be included in his TCRSS but not his CRSS.

which guide the ordering of elements in imaged retail space. Because of the exploratory nature of this analysis, it is best to confine our remarks to elements in the TESS and ESS. There are five ordering principles.

First, hierarchies of retail elements are established by the customer. Thus some alternatives, for a variety of reasons, are considered to be more important than others. Several hierarchical arrangements may coexist,[6] at the same and/or different times.

Second, the retail elements are spatial entities and thus imaged retail space, while not necessarily continuous, has boundaries. Since this perceived space (the customer environmental map or CEM) ends somewhere, the extent of the CEM tends to limit additions to, as well as reflect the selective nature of, an ESS.

Third, the retail elements located within such space are conceived as points, even though they may possess dimension and represent cognitive information categories. As points, they possess certain properties which facilitate comparison and measurement.

Fourth, because of their nature as points and macroenvironmental information categories, the ESS elements in a CEM exist in relation to each other. This pattern of

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[6]The coexistence of several hierarchical arrangements is the result of the customer coding retail macroenvironmental information along multiple salient attribute dimensions and being capable of a number of expected patterns of behavior.

relationships constitute a mental geographic set (MGS) which represent the dependent variables and conceptual metrics of a CEM. Elements in an ESS have objective counterparts in an RSS, although some ESS elements may no longer, or never have, existed. The RSS elements are also related to each other in terms of a similar, but objective, set of relationships referred to as a physical geographic set (PGS).

Fifth, the connectivity between any two points is a function of the actual and perceived route between them as well as barriers along that route, physical or otherwise, including availability of a transport mode, terrain, changes in ethnic or socio-economic character of intervening residents, etc. The ordering mechanisms reflect the reciprocal nature of the man-environment interchange in that 1) the properties of the route are a partial function of the nature of the points it connects and 2) the relationship between points is a partial function of the barrier properties of various routes.

The Nature of Customer Environmental Perception

Ordering mechanisms help the customer form a conceptual representation of a relevant portion of the urban retail environment or TRSS. In order to further understand the nature of these ordering mechanisms it is necessary to clarify the nature of customer environmental perception.

The notion of perception has been subject to numerous meanings and applications in different disciplines. In marketing perception remains a highly ambiguous concept which has been associated with a range of subjects extending from the personal outlook of a consumer to his comprehension of a product, price, firm, commercial message, etc. In each case the implied definition differs. The argument has been made that a precise definition of perception is neither necessary nor desirable (Harvey, 1969b). While there may be some merit in this position, we can make a limiting statement to the effect that perception involves some interaction with or transaction between the individual and the environment, i.e. he receives information from the external environment and somehow modifies his experience and/or behavior. Engel, Kollat and Blackwell (Engel, Kollat, and Blackwell, 1968, p. 79), for example, define perception as "the process whereby stimuli are received and interpreted by the individual and translated into a response." In a spatial context, Harvey (Harvey, 1969b, p. 52) has suggested that perception is "the central node in a network which brings together cognitive processes and environmental stimuli and which projects to the act of decision." Since it has proven difficult to develop more specific definitions, it would seem best to define perception, as it is used in the present context, operationally, i.e. in terms of the CEM.

The idea that customers perceive portions of an urban landscape tends to invest the concept of customer environmental

perception with certain properties. Cities, being large physical areas, cannot be perceived in the usual sense. A customer can only appreciate urban space by scanning it temporally, can only act in urban space successively, and thus can only perceive it by forming a collective unity of successive impressions of urban form and content (in the form of a CEM) from a temporal sequence of interactions with the environment. Thus an important component of customer environmental behavior is a process of environmental mapping, in which retail macroenvironmental information is transformed from time integrations of sensory inputs into a cognitive map (T. Lee, 1966; Blaut, 1969; Stea and Downs, 1970). Environmental perception is therefore unlike other forms of perception in that the basic unit of vision is a dynamic sequence of vistas rather than a fixed spatial location.

<u>The Functions of a CEM</u>

A customer's repeated transactions with the urban environment provide him an almost continuous input of physical and nonphysical information. Due to the previously discussed selective tendencies, these inputs are neither allotted equal storage space nor stored indefinitely. They do however have the potential capacity to modify the image or environmental map which the customer has built up over time. In its role as a selector and modifier of relevant environmental inputs, a CEM acts as a substitute for direct perception of the urban retail environment. In this surrogate

capacity, the environmental map transforms complex macro-environmental information, derived from temporally successive customer experiences, into an analogical form which the customer can more easily assimilate and manipulate (Blaut, 1969, pp. 14-18; Blaut, McCleary, and Blaut, 1970, p. 338). This process conjoins three types of environmental information concerning any relevant retail element, cognitive meaning, distance, and direction. This is accomplished by coding or mapping this triad of information in the form of a CEM. The resultant set of relations among ESS elements is the MGS. Eventual customer environmental behavior is a function of an opposite process of decoding or unmapping. In accomplishing the transformations involved in coding and decoding the CEM performs three essential functions. In its reduction function it builds a personally relevant model from fragmentary real world perceptions. In its rotation function it translates the imagined eyeview to an overhead projection (hence the reference to the ordering of relevant elements or cognitive categories as points). Lastly, it simplifies urban environmental complexity and thus performs an abstraction function.

The CEM as a Theoretical Construct and Experimental Behavioral Output Mode

The supposition that an individual somehow perceives a large area by forming, in the previously described manner, an image map of that area has historical roots which reach back over fifty years. Trowbridge (Trowbridge, 1913), for

example, presented a link between perception and imagery in an early investigation of human orientation and so-called imaginary maps. He suggested that two fundamental methods of orientation guide spatial behavior. Domi-centric orientation, utilizing the home origin as a chief reference in guiding spatial behavior, was considered to be dominant in the home vicinity. In other cases ego-centric orientation, which involves learning to use objects or points on the horizon corresponding to compass point directions was thought to be employed. Trowbridge suggested that erroneous impressions of compass point direction formed the basis for an incorrect ego-centric orientation and thus for an imaginary, or erroneous, map of the environment. Shortly thereafter, in a separate but related set of investigations, neurological researchers found evidence that individuals develop a personal spatial organization, in the form of a "body schema" or "body image" (T. Lee, 1966, pp. 22-4), which seems to exist in partial independence of physical modification.

Both cases suggest a tendency to form personal images of a physical entities which are often at variance with reality. These ideas have greater significance when integrated with Tolman's (Tolman, 1948) notions of mapping and decision behavior. Tolman employed the term cognitive map to refer to a nonliteral, but conceptually spatial, mapping process, which he observed in rats as they connected paths and goals. He also extended the concept to human behavior as well. The customer environmental map differs from

Tolman's cognitive map in a number of respects but retains an original Tolmanian characteristic in that it represents cognitive activities of unknown nature but known effect and function.

Thus the CEM is presented here as a theoretical construct of potential research value to marketing analysts and planners. It is a construct which they may use rather than believe in. The term "map" refers to a nonliteral, but conceptually spatial, analogy. The analogies involved are matters of process and function rather than product and structure. The customer is seen as unmapping or decoding stored environmental information in answer, for example, to questions regarding the cognitive meaning of a retail element, the location of an element in the ESS, or what element in the TRSS is located at some point. Naturally the actual manner in which the customer codes or engages in mapping to transform information into storageable form is hidden from observation. This is why the process analogy, i.e., the function performed by the CEM, has been stressed. Besides this role as a theoretical construct, the map concept is also employed here as an experimental behavioral output for research. In this latter capacity, as Blaut (Blaut, 1969) has noted, the map is a material model of unobservable cognitive processes or "the unobservable black box into which mapping operations are presumably plugged in like lamp cords."

As previously noted the use of the term perception in relation to environmental maps involves a different meaning from that used in many psychological studies. Such studies have focused on eidetic imagery, i.e., "absolute precision of memory for things once seen, a visual definition of a visual presentation of a visual stimulus" (Stea and Downs, 1970, p. 3). The surrogate nature of environmental perception is quite unlike that associated with eidetic imagery. In addition, the CEM, like Tolmanian maps, is built from more than visual inputs. As the psychologist Welsh has noted (Welsh, 1966, p. 423), perception of the urban environment involves multiple sense modalities. Abse (Abse, 1966, pp. 423-4), a psychiatrist, suggests that organization and meaning is given to these various sensations in a process of environmental perception involving associatism and Gestalt similarity.[7] Together with the time integrated surrogate nature of the CEM, the fact of multiple sense inputs supports the position that the CEM's images are not entirely eidetic.

Since spatial behavior is not limited by visual experience and since urban images do not appear to be entirely eidetic, it seems best to presume that the CEM is not entirely graphic. The choice of graphic maps produced from memory, in the tradition of Lynch, as an output mode and one type of overt response from a subject does not mean that such maps

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[7]These ideas are especially interesting when viewed in connection with DeJonge's (1962) findings that urban images tend to be formed according to Gestalt guidelines.

are presented as a reification of a customer's CEM (Blaut, 1969, p. 10; Stea and Downs, 1970). Although he also employed verbal responses, the appeal of Lynch's maps has made it easy to equate cognitive representations of the urban environment with graphic outputs. Hopefully we shall avoid this pitfall. While there is no necessary correspondence between mental and cartographic maps, the geographic reification of the term "map" has, as previously indicated, been coupled with the eidetic reification of "image." We continue to use these terms for reason of consistency. Problems of interpretation will be avoided if the role of the CEM as a theoretical construct and experimental output mode is noted.

Urban and eidetic imagery also differ in that a source of differential environmental perception is the existence of perceptual opportunities. The fact that urban images are only partial (Lynch, 1960) and that residents in different areas often have mutually exclusive urban images (Michelson, 1970, p. 45) may be caused by the fact that urban spatial behavior is largely confined to a limited action space. Movement within this space as well as its dimensions, apparently related to the life cycle and social class of its inhabitants (Fried and Gleicher, 1961; Duhl, 1963; Webber, 1964; Willis, 1969; Beck, 1970; Strauss, 1970), place definite restrictions on perceptual opportunities and leads to a highly selective image of the city and its elements (Lynch, 1960; Tilly, 1967; W. A. V. Clark, 1969). It is this

"awareness space" or what Clark (W. A. V. Clark, 1969, p. 39) has called a mental map of the action space that is used in making household decisions.

A lack of knowledge concerning brain storage and neurophysiological processes prevents us from specifying the exact actual nature of a CEM (or any mental) map or even from directly testing for its existence. As a hypothesized component of environmental behavior, customer mapping, like other mental processes, can only be studied indirectly. Thus we utilize the role of the CEM as a construct and output mode to study how customers appear to code and decode relevant macroenvironmental behavior for purposes of spatial behavior. If customers behave or describe their behavior in accordance with the map framework, then its application as a theoretical construct is justified.

Measurable Conceptual Metrics of the CEM

Adhering to Stea's original contention, it is suggested that CEM's are measurable in that the actual and imagined behaviors which operationally define such maps have discernible metric characteristics. Empirical objectives thus focus on measuring deviations in MGS metric estimates from corresponding PGS relations and deviations of one metric estimate from another.

The mental geographic set represents the subjective pattern of relationships between points in a CEM. CEM points

are related in terms of 1) absolute location, 2) relative location, and, by implication 3) the extensity of the CEM, and 4) interposed barriers. CEM points themselves have been presented as ESS elements. In that capacity they are macroenvironmental information categories which also have measurable properties.

Absolute location

As a component of the MGS, absolute location is determined by absolute distance, a subjective phenomena only generally corresponding to, and not necessarily equaling, the objective absolute distance measure (For a contrasting view see Lowry, 1970, pp. 52-3) of the PGS. The latter absolute distance function, "d," defines the absolute location of retail elements in urban spatial reality, U, the actual metric space containing TRSS elements. If we consider r, s and t to be three retail elements or points in U and d(r,s) to represent the absolute distance between r and s, we may say that (U,d) is a metric space insofar as three conditions are satisfied:

(1) $d(r,s) \geqq 0$; $d(r,s) = 0$ if and only if $r = s$

(2) $d(r,s) = d(s,r)$, i.e. distance is symmetric

(3) $d(r,s) + d(s,t) \geqq d(r,t)$, the triangular inequality.

An important question is whether the imaged retail space of a CEM is metric in the above sense. To form tentative conclusions, we must first understand the nature of the absolute distance concept.

In its simplest form the absolute distance measure of the PGS is the interval, measured in the standard linear manner, between two elements or points as they would exist in a two-dimensional plane (Gutman, 1966, p. 106; Michelson, 1970, p. 48). Physical distance is a less realistic measure, in an urban context, than functional distance (Gustman, 1966, p. 106; Michelson, 1970, p. 173), the distance actually traversed. As a modified physical distance measure, functional distance is, however, somewhat myopic in that it neglects the potentially more relevant time (or possible monetary costs) involved in spatial movements. For this reason it has been suggested that time is a useful and realistic measure of functional distance (Gist and Halbert, 1956, p. 78; Isard, 1960, p. 206; B. Thompson, 1967; Yuill, 1967, p. 113; Brunner and Mason, 1968; Cox and Cooke, 1970), in a fashion similar to that involved in measuring economic distance (Deutsch and Isard, 1961).

This latter version is not a totally adequate measure of the absolute distance component of the MGS (mental geographic set) for four reasons. First, as discussed, the costs associated with customer movements are not confined to merely time or money and are not what might be considered transport costs. Second, certain potentially relevant costs may not even enter into a given customer's environmental decision process. Third, the costs which are relevant will tend to vary with the environmental situation and depend, for instance, on available transport mode or a customer's

expectations regarding his pattern of behavior on the forthcoming trip. Finally, the weight associated with different costs would depend both on customer characteristics and the environmental situation.

It is therefore incorrect to associate the absolute distance measure of a MGS with either functional or economic distance. To do so is to produce a vision of an essentially nondimensional urban reality and to perpetuate the normative behavioristic tradition which, as already shown, characterizes much spatial theory (Olson and Gale, 1968). The absolute distance variable in the MGS is more closely related to the notion of ecological distance (Janson and Rudolphson, 1965), the statistically expected value or weighted sum of different costs associated with a functional spatial interval and considered, in the given environmental situation, relevant by the customer. Thus underlying the absolute distance variable in the MGS is the operation of a composite distance (Boalt and Janson, 1957, p. 285) or effective distance mechanism (Deutsch and Isard, 1961), which conceptually at least, includes a distance vector in n-dimensional space, whose components include all personally relevant aspects of distance (physical distance, monetary cost, time, various psychological costs, etc.) and a weight vector of equal dimension containing the corresponding weights for each of the above aspects of distance. Thus while we cannot directly investigate its operation, we should understand that absolute distance component of the MGS, as

a subjective time or distance estimate (See D. L. Thompson, 1963, and Feldman and Star, 1971), reflects the nature of this mechanism.

Relative location

In addition to its absolute location, the retail element in a CEM also possesses a relative location or bearing. This impression of direction relates both to the relative location of the element itself and to the direction taken from some origin to reach that goal. A perceived geodesic connecting, for example, a home origin with a potential alternative and the perceived bearing from the retail alternative to that origin provides a unique representation of their relationship.

Notions concerning the relative location of respective retail alternatives are produced by the operation of an orientation mechanism. While, once again, we cannot specify the exact nature of its operations, we can postulate the existence of two modes of orientation which form the basis for CEM coordinate systems. On one hand an ego-centered coordinate system would give a customer direction in terms of his own position. A second type of coordinate system might be termed as "shared" in that it is a form of orientation reference for a number of individuals. There are two possible classes of shared coordinate systems. In the first or universal coordinate system bearing is based on map or compass point direction. The second or consensual

coordinate system provides notions of direction which are at variance with universal coordinates. This disparity is a local bias which must be taken into account. When the bias is confined to a city or any portion of an urban area we are dealing with a microlocal consensual coordinate system. When the bias is regional we may speak of a macrolocal consensual coordinate system (Stea, 1969).

Extensity

The extent of the CEM is a function of the individual's action space (Wolpert, 1965; W. A. V. Clark, 1969; Horton and Reynolds, 1969), the perceptual and objective area within which he has contact and within which his spatial activities take place. As previously noted, despite a theoretical access to a wide range of environmental information, usually only a limited portion of the urban environment is relevant to spatial behavior. The degree to which a customer's behavior in his action space reflects the total nature of the objective retail environment depends on his ability to collect and assimilate pertinent environmental information. It is apparent in the present framework that individuals (as customers) rather than goods (as attractive objects) have a range, composed of an aerial extent of behavior and a frequency of position (Craik, 1970, pp. 27-36) which together indicate the likelihood of being at a given point.

The range of a customer's action space is thus related to the extensity of the CEM. While individual environmental

perception and thus range and action space may differ, certain common spatial tendencies are likely to exist with respect to certain groups insofar as they share similar perceptions or cognitive images of the urban environment, perceptions of time, and time preferences (Horton and Reynolds, 1969). These shared characteristics and their associated action spaces are not static. Changes in the structure of the urban environment as well as technological changes produce a continuous reordering of perceived urban spatial structure. The distal effects, however, are not easily predictable. The automobile, for example, extended action spaces but also caused spatial distortions within areally increased action spaces by producing congestion and all its concomitant psychological and physiological effects (Horton and Reynolds, 1969; Willis, 1969, pp. 185-6). When various structural and technological changes combine with perceptual lags, they prevent the possibility of either spatial equilibrium or economically rational behavior.[8] Nevertheless, urban environmental perception and the CEM should be in some form of dynamic equilibrium with customer range and action space.

For these reasons, it is important to seek an understanding of CEM extensivity in terms of surface features and

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[8]Perceptual lags in environmental perception have been encountered in the form of "after-images" of elements, which persist despite the disappearance of their physical counterparts from the city-scape (see Porteus, 1971).

temporal characteristics (Stea and Downs, 1970, p. 6). The spatial extent of a CEM furnishes important clues as to the spatial decay of macroenvironmental information in an urban context. Further insights would be provided by establishing whether and what surface qualities are exhibited by the CEM. The concern here centers on the apparent boundaries to a CEM and whether a continuous or discontinuous distribution of RSS elements is represented. Continuity refers to the representation of RSS elements within a bounded area in conformity with their actual and relative locations. Of further value would be an understanding of the temporal stability, the temporal rate of information decay, and the responsiveness of the CEM to urban structural and technological change. This information will provide answers concerning CEM size and shape, two facets of extensity, and how a RSS element which becomes part of the ESS is "included" in an existing CEM. Since there is an increasing awareness that the perceived range of shopping alternatives plays an important role in the formation of urban action spaces (T. Lee, 1966, 1968; Horton and Reynolds, 1969) a study of these matters has a significance which is not limited to marketing theory or the planning of retail facilities.

Barriers

Physical and nonphysical barriers may exist between any two points in a CEM. The nature of a barrier can be determined with reference to its character along three

continua of 1) permanence, 2) permeability, and 3) quality (natural to man-influenced).

A street repair project which decreases permeability to zero is impermanent and highly man-influenced. A change in the ethnic or racial character of an intervening neighborhood, while not an objective impediment, may constitute a conceptual barrier which is considered permanent, has zero permeability, and is highly man-influenced. In studying barrier strength it is necessary to consider permeability and barrier symmetry, the extent to which permeability differs when a barrier is approached from different points.

An understanding of these matters will be helpful in uncovering whether absolute distance is commutative, the factors contributing to a disparity between relative location in an MGS and the PGS, and the forces operating to produce boundaries. This provides a basis for judging the relative accessibility of a retail structure in mental rather than purely physical terms.

The cognitive structure of ESS elements

In addition to absolute location, relative location, extensity, and barriers which together form MGS and define the relationship between ESS elements, a CEM also contains information about the cognitive meaning of ESS elements. This information is arranged in terms of salient store attributes (SSA), those attributes which are considered as important by the customer and which potentially differentiate

ESS elements. We can think of this information as structured in terms of an n-dimensional salient attribute weight vector (SAWV), which contains information concerning the relative importance of n SSA's in the form of relative weights, and a nxm store rating matrix (SRM), containing the relative ratings of m ESS elements in terms of n SSA's. The product of the SAWV and SRM is a weighted store rating (WSR) for each ESS element. It would appear worthwhile to consider the role of the cognitive structure or meaning of ESS elements, in terms of both SRM elements and WSR's, in influencing MGS components.

Summary Statement and Definition of a CEM

The previous analysis has suggested that urban retail environmental decisions are made by customers with a limited ability to deal with macroenvironmental complexity. Therefore, customers, of necessity, must simplify and adjust their personal conceptions of urban retail reality. It is suggested that we study such personal conceptions by means of a construct called the customer environmental map (CEM) in order to evaluate degree of correspondence between this imaged space and physical reality and to identify sources of potential disparity.

It has been suggested that for purposes of research the CEM can be employed as an exploratory behavioral output mode capable of eliciting a customer's mental representation of relevant urban retail reality in terms of an imaged one-,

two-, or three-dimensional array of points representing ESS elements or stores which are considered acceptable by the customer. Several hierarchical arrangements among these points may coexist or exist at different times. Within the boundaries of this imaged retail space two points are considered as connected if an actual or imagined path exists between them. The points themselves are cognitively structured information categories and are related to each other in terms of a subjective set of geographical relations (the MGS), including absolute location, relative location, extensity, and intervening barriers. Thus, for purposes of a tentative definition a customer's environmental map is defined as a bounded, one-, two-, or three-dimensional space containing a finite number of retail points connected by paths with various interposed barriers.

Developing an abstract model and finalizing its operation are separate matters. Model building requires a certain degree of guarded speculation. Final operationalization requires careful testing and inevitable reformulation. An effort has been made to indicate the exploratory nature of the model presented here. In its present form, the model functions primarily as a theoretical construct. Its role as an experimental behavioral output mode is understandably restricted by the lack of a complete accompanying methodology. Nevertheless, as a theoretical construct, the model does have the ability to generate testable hypotheses.

As previously indicated, the model's dependent conceptual metrics are absolute location, relative location, extensity, and barrier strength. Twenty-eight potential independent variables, arranged in terms of five separate groups, are presented below.

Group I: Point-Related Variables

1. Familiarity with the area.
2. Familiarity with the store.
3. Attractiveness of the store (the WSR).
4. Attractiveness of the store in terms of each SSA dimension.
5. RSS concentration in the area.
6. ESS concentration in the area.
7. Relative total attractiveness of ESS elements in the area (summed WSR's in the area).
8. Changes in the retail structure.

Group II: Path-Related Variables

1. Familiarity with the trip.
2. Direction of the ESS element relative to the customer's residence and the center of the city.
3. Stimulus complexity of the path.
4. Relative attractiveness of the path.
5. Number of RSS elements on the path.
6. Number of ESS elements on the path.
7. Number of turns.
8. Imagined direction of movement on the path.

Group III: Barrier-Related Variables

1. Noncommutative barriers.
2. Kinds of barriers.
3. Number of barriers.

Group IV: Customer-Related Variables

1. Socio-economic status.
2. Stage in the life cycle.
3. Personality.
4. Neighborhood.
5. Length of residence at present address.

Group V: Miscellaneous Variables

1. Size of metric being estimated.
2. Travel mode typically used.
3. Travel role (driver, passenger, or commuter) typically adopted.
4. Technological changes.

Hypotheses

The enumeration of all testable hypotheses involving these variables is beyond the scope of the present exploratory effort. Instead, five representative hypotheses are presented and tested in order to further the development of an eventual methodology and hasten final operation.

I. Given differences in the preference levels of ESS elements, the magnitude of relative location distortion will be greater in the case of less preferred elements.

II. Given differences in the preference levels of ESS elements, the magnitude of absolute location distortion will be greater in the case of less preferred elements.

III. Given differences in the preference levels of ESS elements, the direction of relative location distortion will tend to differ for most and less preferred ESS elements.

IV. Given differences in the preference levels of ESS elements, the direction of absolute location distortion will tend to differ for most and less preferred ESS elements.

V. Given differences in the preference levels of ESS elements, there will be a tendency to violate the metric property of symmetry.

CHAPTER III

METHODOLOGY

Testing the hypotheses requires measurement of the relationship between the cognitive structure of ESS elements and the absolute and relative location components of the MGS. To examine this relationship a questionnaire was constructed, modified on the basis of exploratory interviews and pretest results, and administered to a sample of customers.

The Questionnaire

The primary objective of the questionnaire was to obtain a set of responses indicating the cognitive structure and absolute and relative locations of an elicited ESS. Questionnaire construction involved six principal tasks: (1) specification of an expected pattern of behavior, (2) composition of salient store attribute (SSA) statements, (3) composition of store rating statements, (4) development of relative location measures, (5) development of absolute location measures, and (6) development of a demographic data profile.

The Expected Pattern of Behavior

An expected pattern of behavior refers to a customer's expectations regarding the character (instrumental versus

congenial) and nature (purchase versus search) of a forthcoming trip. Specification of an expected pattern of behavior required the presentation of information regarding product class, purchase intention, extent of prior knowledge. This information was given in the form of a question, presented in Figure 1, designed to elicit an ESS. The product class, pants suits, was chosen after preliminary pretest of other possible products.[1] The product class chosen seemed suitable because the perceived complexity, social visibility, durability, and price range of alternatives within the product class appeared compatible with extended forms of decision process behavior and relatively extensive prepurchase search behavior. These factors increased the likelihood of multiple ESS elements. In addition the likelihood of purchase in the recent past and/or near future added to the suitability of the product class for purposes of exploratory research. To take advantage of the large number of perceived potential alternatives in the product class, purchase intention was specified in a manner to suggest that a purchase decision, as opposed to only additional product and/or brand information, would evolve from an initial state in which the product class but not the style or brand was specified. Specification of prior knowledge also concerned general product use and experience

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[1]Less satisfactory results were obtained using other products, including furniture, cosmetics, shoes, and dresses.

Suppose you wanted to buy a pants suit (for casual wear) and did not have any style or brand in mind. What stores in Gainesville (which you have visited) would you now visit in order to help you decide which pants suit to buy?

STORES

1. ______________________________

2. ______________________________

3. ______________________________

4. ______________________________

5. ______________________________

6. ______________________________

7. ______________________________

Figure 1. Specification of an Expected Pattern of Behavior Necessary Elicit an Evoked Store Set

with ESS elements, although an actual past purchase was not required. Taken together, this information directed respondents' attention toward an expected pattern of behavior while providing sufficient flexibility for individual interpretation and response in the form of an ESS.

Salient Store Attributes

Having elicited an ESS based on a specified expected pattern of behavior, it was necessary to examine the role of ESS elements as macroenvironmental information categories by determining their cognitive structures. Initially this required the identification of SSA and determination of the importance of various attributes. These steps made it possible to construct an appropriate salient attribute weight vector (SAWV) for each subject. Ten store attributes, presented in Figure 2, were identified in unstructured exploratory interviews (and modified after pretests) as dimensions or categories of meaning which respondents tended to structure to provide store evaluations and a basis for decision making in connection with the expected pattern of behavior previously outlined. The ten attributes listed were formed by grouping pretest responses into broad categories of meaning. This served to avoid needless complexity and confusion by respondents while maintaining ample freedom of interpretation within the limits of an attribute category or dimension (see Fisk, 1961-62 and Rich and Portis, 1964). As shown in Figure 2, respondents were also provided with

Here are a number of store characteristics which some people feel are important when they are shopping for a pants suit. Please indicate how important each of these characteristics is to you (when you are shopping for a pants suit) by giving it a rating from 0 to 9. For example, if a particular characteristic is totally unimportant to you give it a rating of 0. If a particular characteristic is very important to you give it a rating of 9. If you think a particular characteristic's importance lies between these extremes give it a rating somewhere between 0 and 9. Now what rating would you give:

CHARACTERISTIC	RATING
1. Price of Merchandise	______
2. Quality of Merchandise	______
3. Assortment of Merchandise	______
4. Fashion of Merchandise	______
5. Display and Presentation of Merchandise	______
6. Helpfulness of Sales People	______
7. Credit Arrangements	______
8. Returns and Adjustments	______
9. Physical Atmosphere in Store	______
10. Nature of the Typical Customer	______

Are there any other store characteristics which are important to you when you are shopping for a pants suit?

11. ______________________________ ______

12. ______________________________ ______

13. ______________________________ ______

Figure 2. Presentation of Potential Salient Store Attributes for the Determination of a Salient Attribute Weight Vector

an opportunity to identify other salient attribute dimensions. Store attributes were presented in the same order to all respondents. The desire for random presentation was outweighed by the exploratory nature of the study, the assumption that previously existing "halo effects" would overshadow any order effects imposed by the present study, and the fact that the study dealt with cognitive structure as a global phenomena.

Respondents were asked to indicate the importance of each attribute. Taking advantage of the space provided by a separate card, a scale of vertical structure, as presented in Figure 3, was employed, since the implied "thermometer effect" seemed desirable. The scale was labeled on the extremes as <u>Very important</u> and <u>Totally unimportant</u>. Numbering of each interval served as a convenience to subjects, provided a basis for coding, and, in the case of <u>Totally unimportant</u> ratings, cancelled out store attributes which were not considered as salient.

<u>Store Ratings</u>

Having already identified SSA and associated attribute weights, respondents were asked to rate ESS element in terms of each of the SSA, as shown in Figure 4. Store attributes were presented in decreasing order of rated importance. Non-salient or zero-rated attributes were presented last in order to preserve consistency and facilitate future analysis. In the case of identical ratings the original order of

9 ______ Very important

8 ______

7 ______

6 ______

5 ______

4 ______

3 ______

2 ______

1 ______

0 ______ Totally unimportant

Figure 3. Vertical Scale for the Determination of a Salient Attribute Weight Vector

Now just considering (<u>individual store characteristics presented in decreasing order of rated importance</u>) and nothing else please rate each store you mentioned from 1 to 9. For example if a store rates as extremely bad in terms of this characteristic give it a 1. If you feel that a store rates as extremely good in terms of this characteristic give it a 9. If you think that a store rates between these extremes in terms of this characteristic give it a rating somewhere between 1 and 9.

Now how would you rate (store) in terms of (characteristic).

STORES	RATING
1. ______________________	______
2. ______________________	______
3. ______________________	______
4. ______________________	______
5. ______________________	______
6. ______________________	______
7. ______________________	______

Figure 4. Presentation of Salient Store Attributes for the Determination of a Store Rating Matrix

presentation was maintained. Using this procedure, each evoked store was rated in terms of one attribute before the attribute with the next highest rating of importance was presented. This order of presentation was adopted because the use of a decreasing order of rated importance appeared to offer the most satisfactory solution to the confound produced by interacting order effects and halo effects. The ESS was presented in the original order in which it was elicited.

Respondents were asked to indicate how each store rated in terms of each SSA. Taking advantage of the space provided by a separate card, a scale of vertical structure, as presented in Figure 5, was employed, since the implied "thermometer effect" seemed desirable. The scale was labeled on the extremes as _Extremely good_ and _Extremely bad_. Numbering each interval served as a convenience to respondents and provided a basis for coding.

After establishing the nature of the cognitive structure of an ESS, the questionnaire was designed to obtain information regarding certain MGS components. The questions, as described below, were developed to create the movement imagery of a virtual trip (Huff, 1960), i.e., perceived customer movement from one place to another. Thus respondents were required to undergo, but not describe, a telescoped imaginal traveling experience (Ryan and Ryan, 1940) in which places, distances, and directions are identified as a result of an imaginal trip, i.e., a series

9 ______ Extremely good

8 ______

7 ______

6 ______

5 ______

4 ______

3 ______

2 ______

1 ______ Extremely bad

Figure 5. Vertical Scale for the Determination of a Store Rating Matrix

of created events occuring under the assumption of a specified pattern of expected behavior. The information furnished by respondents is considered to be the product of a dynamic environmental mapping process (Stea, 1969) in which a space containing important points is imagined and in which interaction with these points takes place.

Relative Location

Two measures of relative location were constructed for this study. The more indirect measure involved, as shown in Figure 6, asking respondents to locate each ESS element in relation to their home. A somewhat more direct measure of relative location was provided, as shown in Figure 7, by having subjects indicate the direction of each ESS element, using their home as a reference point. To maintain the integrity of each measure the latter question was presented to subjects after the first measure of relative location and the two direct measures of absolute location described below. Subjects were not allowed to refer to the earlier location sketch when indicating the direction of each ESS element by drawing a line through the edge of the circle whose center was to be considered as their home.

Absolute Location

Three principal measures of absolute location, estimates of physical distance and time (the direct measures) and an indication of convenience (an indirect measure),

Suppose that the "X" on this piece of paper represents your home. Please indicate where each store you mentioned is located in relation to your home. Please be sure to label each store

---

N

W X E

S

Figure 6. Indirect Measure of the Relative Location of Evoked Store Set Elements in a Mental Geographic Set

Suppose that the "X" in the center of the circle below represents your home. Please indicate the direction of each of the stores you mentioned by drawing a line through the edge of the circle. Please be sure to label each store.

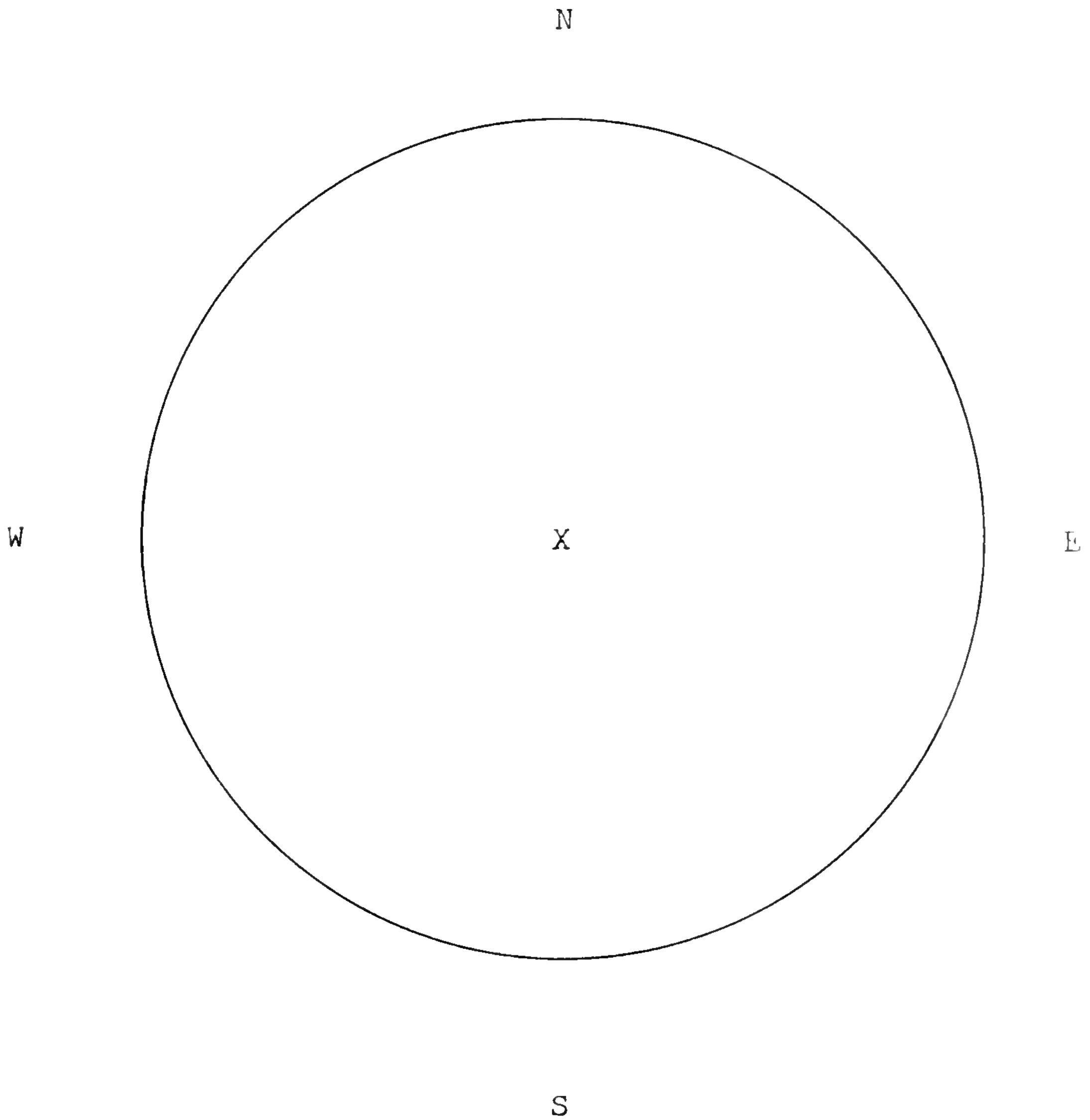

Figure 7. Direct Measure of the Relative Location of Evoked Store Set Elements in a Mental Geographic Set

were employed. As depicted in Figure 8, subjects were first asked to indicate how far it was (to the nearest tenth of a mile) from their home to each ESS element and from each element to all others. Next they were asked to make the same judgments in terms of time (to the nearest minute),[2] as shown in Figure 9. In both cases the metric property of symmetry was not tested and absolute distance judgments were made in only one direction.[3]

An indirect measure of absolute distance was obtained by asking subjects, as depicted in Figure 10, to indicate the convenience each ESS element in terms of its accessibility from their home. Taking advantage of the space provided by a separate card, a scale of vertical structure, as shown in Figure 11, was employed, since the implied "thermometer effect" seemed desirable. The scale was labeled on the extremes as Extremely convenient and Extremely inconvenient. Numbering each interval served as a convenience to subjects and provided a basis for coding.

An additional supplemental and abbreviated test of metric symmetry, as presented in Figure 12, was introduced as a last measure of the absolute distance properties of the MGS.

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[2]These judgments were all made with the assumption that a motor vehicle was involved.

[3]The symbols "xxx" indicate that these judgments of absolute distance were not solicited.

How far is it (to the nearest tenth of a mile)

<u>from</u>

to store	your home	store 1	store 2	store 3	store 4	store 5	store 6	store 7
1.		xxx	xxx	xxx	xxx	xxx	xxx	xxx
2.			xxx	xxx	xxx	xxx	xxx	xxx
3.				xxx	xxx	xxx	xxx	xxx
4.					xxx	xxx	xxx	xxx
5.						xxx	xxx	xxx
6.							xxx	xxx
7.								xxx

Figure 8. Direct Measure of the Absolute Location of Evoked Store Set Elements in a Mental Geographic Set in Terms of Physical Distance

How far is it (to the nearest minute) on an average shopping day

<u>from</u>

to store	your home	store 1	store 2	store 3	store 4	store 5	store 6	store 7
1.		xxx	xxx	xxx	xxx	xxx	xxx	xxx
2.			xxx	xxx	xxx	xxx	xxx	xxx
3.				xxx	xxx	xxx	xxx	xxx
4.					xxx	xxx	xxx	xxx
5.						xxx	xxx	xxx
6.							xxx	xxx
7.								xxx

Figure 9. Direct Measure of the Absolute Location of Evoked Store Set Elements in a Mental Geographic Set in Terms of Time

Please rate each of the stores you mentioned from 1 to 9 to indicate how convenient it is to get to. For example, if you feel that a particular store is extremely inconvenient give it a rating of 1. If a particular store is extremely convenient give it a rating of 9. If you think that a store's convenience lies between these extremes give it a rating somewhere between 1 and 9. Now how would you rate:

STORE	RATING
1. ________________	______
2. ________________	______
3. ________________	______
4. ________________	______
5. ________________	______
6. ________________	______
7. ________________	______

Figure 10. Indirect Measure of the Absolute Location of Evoked Store Set Elements in a Mental Geographic Set in Terms of Rated Convenience

9 ______ Extremely convenient

8 ______

7 ______

6 ______

5 ______

4 ______

3 ______

2 ______

1 ______ Extremely inconvenient

Figure 11. Vertical Scale for the Determination of the Absolute Location of Evoked Store Set Elements in a Mental Geographic Set in Terms of Rated Convenience

How far is it from (<u>the last store mentioned</u>) to (<u>the first store mentioned</u>).

to the nearest tenth of a mile ________________

to the nearest minute (on an
average shopping day ________________

Figure 12. Abbreviated Test for the Metric Property of Symmetry

Demographic Profile

A demographic profile was collected to secure information concerning the characteristics of respondents. As shown in Figure 13, data was gathered concerning the age, marital status, number of children, education, occupation, and social class of respondents. This information was requested to facilitate possible cross-classification and to indicate the degree of relative homogeneity among respondents.

Respondents

The respondents included 31 women residents of the University of Florida married student housing complex. Two women were Diamond Village residents while the remaining subjects lived in neighboring Schucht Village. The only restrictions placed on respondents were that they were adult women living in close proximity to each other who normally had access to a motor vehicle for purposes of a shopping trip and who had lived in the housing complex for at least one year. Restrictions were based on a desire to avoid the possible confound caused by the operation of different microlocal consensual coordinate systems. Respondents were unaware of the hypotheses being tested and their knowledge of the study was confined to the information provided to all subjects when interview appointments were made and during the interview itself.

Please check the appropriate spaces.

1.) Age	Under 20	___
	20 to 29	___
	30 to 39	___
	40 & over	___
2.) Marital Status	Single	___
	Married	___
	Separated	___
	Divorced	___
3.) Children	None	___
	One	___
	Two	___
	Three	___
	Four or more	___
4.) Education	Some elementary school	___
	Elementary school degree	___
	Some high school	___
	High school degree	___
	Some college	___
	College degree	___
	Some graduate school	___
	Graduate degree	___
5.) Occupation	Housewife	___
	Student	___
	Clerical	___
	Sales	___
	Skilled	___
	Professional	___

6.) (For housewives only) If you were to work outside your home what type of a job would you seek?

	Student	___
	Clerical	___
	Sales	___
	Skilled	___
	Professional	___

7.) Social Class

If you were asked to use one of these names for your Social Class, which would you say you belonged to?

Middle Class	___
Lower Class	___
Working Class	___
Upper Class	___

Figure 13. Demographic Data Profile Form

Field Procedure

No unusual events were observed in the collection of information which might jeopardize the analysis of results. Consistent collection procedures were made possible by the absence of unforseen circumstances and by modifications in the questionnaire and in field collection procedures based on pretest interview experience. All respondents were contacted by telephone to secure their cooperation in taking part in a research project dealing with customer behavior. Appointments were made and no further information was provided at that time. The cooperation of residents was excellent throughout the study and few refusals were encountered. Respondents received no compensation for their cooperation. All data were collected between December 10 and December 13, 1971.

A two-hour training session was held with the interviewing team of four women. Interviewers included two graduate students and a recent doctorate in educational psychology and a full-time staff employee of the University Counseling Center. All four team members had considerable past interviewing experience. The training session included a brief description of the general study and a detailed discussion of the questionnaire and interviewing procedure. Each interviewer was given a schedule of interview appointments. Interviewers were instructed not to reveal the nature of the study and to stress the importance of securing respondents' judgments and cooperation.

All information was personally recorded by the interviewers, with the exception of the two questions dealing with relative location, and was collected during the twenty to thirty minutes necessary to conduct the interview.

CHAPTER IV

RESULTS

Results of this exploratory study are presented in two sections. First there is a presentation of the data obtained from completed questionnaires and a statistical analysis of that data. Secondly, these results are interpreted in terms of the previously described theory of customer environmental behavior and perception.

Presentation and Analysis of Results

Results are presented in terms of respondents' demographic profiles, cognitive structure variables, and measures of relative and absolute location. Inspection and preliminary analysis are then used to provide a basis for analysis and direct consideration of the hypothesized relationships.

Demographic Data Profile

Table 1 presents distributions of respondents' age, marital status, number of children, education, occupation, and social class. Observation of these distributions leads to the conclusion that respondents constitute a highly homogeneous group. Such a contention, however,

TABLE 1

RESPONDENTS" DEMOGRAPHIC DATA PROFILE

Characteristic	Class	Number
Age	Under 20	0
	20 to 29	31
	30 and over	0
Marital Status	Single	1
	Married	30
	Divorced	0
No. of Children	None	14
	One	10
	Two	7
Education	High School Degree	2
	Some College	12
	College Degree	8
	Some Graduate School	7
	Graduate Degree	1
Occupation	Housewife	8
	Student	9
	Clerical	7
	Sales	1
	Skilled	2
	Professional	4
Housewives' Desired Occupation	Student	1
	Clerical	4
	Professional	3
Social Class	Middle Class	28
	Lower Class	1
	Working Class	2

must be qualified with the recognition that the salient dimensions of customer homogeneity have not yet been established with respect to environmental behavior and perception. While it is not feasible in this exploratory effort to investigate potential sources of differential response, an attempt will be made to isolate the responses of a more homogeneous subset of respondents.[1] This distinction has been drawn to increase our sensitivity to different environmental perceptual tendencies arising from differences in spatial mobility patterns. The subdivision of respondents will therefore be confined to the presentation and analysis of relative and absolute location (MGS) measures.

<u>Cognitive Structure</u>

Inspection of Tables 2 and 3 reveals that elicited ESS's tended to vary in terms of both size and the location[2] (in terms of PGS) of elements. Elements in the same ESS were often in close proximity to each other. Since the present focus is limited to the relationship between

---

[1]The subset of respondents (N = 21) was formed by eliminating those five subjects who were housewives and one unmarried subject (Who was permitted to live in the complex due to a recent regulation change). In these cases it was felt that the environmental experiences and perceptions of these subjects might be different from those of married, working wives.

[2]Although the distinction between the same and different locations is a potentially complex matter, in this study the distinction was limited to placement in the same mall or center.

TABLE 2

FREQUENCY OF ELICITED EVOKED STORE SIZE

ESS Size[a]	Number[b]
2	4
3	12
4	10
5	3
6	2

[a]Number in column refers to the number of elements in a respondent's evoked store set.

[b]Number in column refers to the number of respondents with a given evoked store set size.

TABLE 3

FREQUENCY OF DIFFERENT AND SAME LOCATIONS OF PREFERENCE OPPOSITES BY ELICITED EVOKED STORE SET SIZE

ESS Size	Different[a] Location[b]	Same[a] Location[b]
2	2	2
3	8	4
4	8	2
5	1	2
6	1	1

[a]Number in column refers to the number of respondents with a given ESS size whose most and less preferred elements were in different (the same) locations.

[b]The distinction between the same and different locations was limited to placement in the same mall or center.

the cognitive structure of ESS elements and the MGS, it was necessary to confine the analysis to preference opposites, i.e. most preferred and least preferred elements (as measured in terms of TSR's). A difficulty encountered in this connection stemmed from the fact that, as can be observed from Table 3, 11 of the 31 preference opposites were in the same location. In addition, as can be seen in Table 4, in two cases no other basis for comparison was available. This made it difficult to test the hypothesized relationships at the level of individual ESS elements. For the remaining nine subjects, however, it was possible to select another alternative. Therefore the decision rule adopted was to substitute the least preferred element in a different location from that of the most preferred alternative. This transformed the comparison to one of most preferred versus less preferred elements. As can be seen in Table 4, this necessitated the rejection of a less preferred alternative in four cases.

The salient attribute weight vector for each respondent, as presented in Table 5, indicates the dimensions of cognitive meaning employed by that customer to evaluate alternative ESS elements. In each case the number of non-zero SAWV elements, as presented in Table 6, is indicative of the number of dimensions along which stores are compared. Table 7 presents information concerning the frequency with which each dimension was actually employed by respondents as an evaluative criteria. The SAWV also

TABLE 4

ELICITED EVOKED STORE SET SIZE AND RANKED PREFERENCE OF LESS PREFERRED SUBSTITUTES FOR LEAST PREFERRED ELEMENTS[a] NOT MEETING THE OTHER-LOCATION CRITERION

ESS Size	Ranked Preference of Substitutes
2	b
2	b
3	2
3	2
3	2
3	2
4	2[c]
4	3
5	2[c]
5	3[c]
6	4[c]

[a]Numerical rank of a least preferred alternative equals the elicited ESS size.

[b]No substitute was possible due to limited ESS size.

[c]Other less preferred alternatives were rejected in order to meet the other-location criterion.

TABLE 5

RESPONDENTS' SALIENT ATTRIBUTE WEIGHT VECTORS

	SAWV Dimension Ratings									
Respondent	I[a]	II[b]	III[c]	IV[d]	V[e]	VI[f]	VII[g]	VIII[h]	IX[i]	X[j]
1	8	7	5	7	6	7	0	7	6	6
2	3	9	9	8	1	1	1	8	3	1
3	9	9	8	5	7	7	5	9	8	7
4	9	9	8	8	5	5	0	4	6	4
5	7	8	8	8	4	5	0	6	4	2
6	6	8	3	8	7	3	0	0	7	6
7	9	9	9	7	5	3	0	8	8	5
8	7	7	9	9	1	0	7	9	3	5
9	9	9	7	9	9	6	6	8	7	6
10	8	9	3	7	7	7	1	8	7	4
11	5	9	5	7	5	9	7	9	9	7
12	7	9	4	8	7	3	1	7	7	3
13	8	8	7	9	6	9	4	9	9	3

TABLE 5 (Continued)

Respondent	SAWV Dimension Ratings									
	I[a]	II[b]	III[c]	IV[d]	V[e]	VI[f]	VII[g]	VIII[h]	IX[i]	X[j]
14	5	9	7	8	5	9	7	8	8	5
15	9	9	9	9	7	9	6	9	9	9
16	5	7	3	7	3	7	0	5	6	1
17	9	8	9	9	3	6	1	8	6	1
18	9	9	8	8	4	8	7	7	5	5
19	5	9	6	4	0	6	4	4	2	2
20	7	9	8	6	5	9	0	5	8	2
21	3	9	6	4	1	6	6	8	3	0
22	9	7	8	8	7	5	0	9	8	6
23	9	9	8	8	6	8	0	9	7	8
24	9	8	8	7	4	2	2	5	7	3
25	5	8	2	9	5	2	2	8	5	5
26	7	8	5	7	2	3	0	0	6	5
27	6	6	4	4	2	3	3	6	5	4

TABLE 5 (CONTINUED)

Respondent	SAWV Dimension Ratings									
	I[a]	II[b]	III[c]	IV[d]	V[e]	VI[f]	VII[g]	VIII[h]	IX[i]	X[j]
28	9	8	6	4	3	7	0	5	6	4
29	3	9	7	9	8	9	1	9	7	6
30	5	9	7	7	7	2	0	9	7	5
31	5	7	6	8	4	4	0	1	2	2

[a]Price of Merchandise
[b]Quality of Merchandise
[c]Assortment of Merchandise
[d]Fashion of Merchandise
[e]Display and Presentation of Merchandise
[f]Helpfulness of Sales People
[g]Credit Arrangements
[h]Returns and Adjustments
[i]Physical Atmosphere in Store
[j]Nature of the Typical Customer

TABLE 6

FREQUENCY OF EMPLOYMENT OF SALIENT ATTRIBUTE WEIGHT VECTORS BY NUMBER OF NONZERO VECTOR DIMENSIONS

Nonzero SAWV Dimensions	Frequency of Employment[a]
10	15
9	14
8	2

[a]N = 31

TABLE 7

FREQUENCY OF EMPLOYMENT OF INDIVIDUAL DIMENSIONS USED AS EVALUATIVE CRITERIA IN SALIENT ATTRIBUTE WEIGHT VECTORS

Individual SAWV Dimensions	Frequency of Employment
Price of Merchandise	31
Quality of Merchandise	31
Assortment of Merchandise	31
Fashion of Merchandise	31
Display and Presentation of Merchandise	30
Helpfulness of Sales People	30
Credit Arrangements	18
Returns and Adjustments	29
Physical Atmosphere in Store	31
Nature of the Typical Customer	30

functions to indicate the importance of various attributes. This information is combined with a customer's evaluation of each ESS element along each attribute dimension in the form of a SRM (see Table 8) to produce a TSR for each ESS element as shown in Table 9.

MGS Measures and Tests of Hypothesized Relationships

Examination of the relationships between the cognitive structure of ESS elements and relative and absolute location components of the MGS was made in terms of comparisons of subjects' MGS responses for most and less preferred elements. Since individual respondents might tend to distort space, i.e. fail to equate MGS and PGS measures, in a systematic fashion, observations concerning more and less preferred elements were treated as potentially correlated pairs of observations. Thus the sum of distortion differences between most and less preferred alternatives divided by the number of subjects or paired observations provided a mean of distortion differences which was equal to the difference between the means of distortion for most and less preferred elements.

Twelve types of actual comparisons were employed to test the hypothesized relationships. The magnitude of relative location distortion was examined by comparing the magnitude of angular distortion for most and less preferred elements in percentage terms. This was done for both indirect and direct measures of relative location. The

TABLE 8

RESPONDENTS' STORE RATING MATRICES FOR MOST AND LESS PREFERRED EVOKED STORE SET ELEMENTS ALONG INDIVIDUAL SALIENT ATTRIBUTE WEIGHT VECTOR DIMENSIONS

Respondent	Preference Level of Rated Element	Ratings for SAWV Dimensions									
		I[a]	II[b]	III[c]	IV[d]	V[e]	VI[f]	VII[g]	VIII[h]	IX[i]	X[j]
1	M[k]	3	8	5	8	6	8	9	8	8	9
	L[l]	5	8	5	7	7	7	9	8	7	8
2	M	7	7	6	8	7	8	8	9	8	7
	L	6	6	6	6	5	6	7	8	2	7
3	M	6	9	7	9	8	9	6	8	9	9
	L	7	8	8	6	7	9	9	8	7	7
4	M	7	9	9	8	7	7	9	9	7	8
	L	7	7	8	8	7	7	9	8	6	7
5	M	9	9	8	9	9	8	8	8	8	7
	L	6	5	4	6	3	5	7	8	5	6
6	M	7	9	9	9	8	9	9	9	8	9
	L	5	8	8	7	6	6	7	7	5	6
7	M	8	9	9	9	9	3	9	9	9	8
	L	8	9	7	8	7	8	8	9	7	7
8	M	7	9	6	7	7	8	8	9	7	7
	L	5	8	5	9	7	9	8	8	7	8

TABLE 8 (Continued)

Respondent	Preference Level of Rated Element	Ratings for SAWV Dimensions									
		I[a]	II[b]	III[c]	IV[d]	V[e]	VI[f]	VII[g]	VIII[h]	IX[i]	X[j]
9	M	6	8	8	9	9	9	9	9	9	9
	L	7	5	6	6	5	9	8	8	7	5
10	M	9	8	9	9	9	9	9	9	9	9
	L	7	9	9	9	9	9	9	9	8	9
11	M	6	7	7	6	6	9	6	8	7	7
	L	5	5	3	4	3	7	6	8	4	4
12	M	3	7	8	8	8	5	5	5	7	5
	L	2	8	5	8	6	6	5	5	7	5
13	M	5	8	6	9	9	8	7	7	9	8
	L	5	5	6	6	4	8	7	8	5	8
14	M	7	8	8	9	9	8	9	9	9	8
	L	8	6	8	7	5	7	8	5	7	8
15	M	9	9	9	7	8	9	9	9	9	7
	L	4	9	5	7	8	9	9	7	9	8
16	M	6	7	8	9	9	7	9	9	9	7
	L	6	8	6	8	4	8	5	8	7	7
17	M	6	7	6	8	8	7	8	7	8	8
	L	1	9	8	8	5	7	5	6	6	8

TABLE 8 (Continued)

Respondent	Preference Level of Rated Element	Ratings for SAWV Dimensions									
		I[a]	II[b]	III[c]	IV[d]	V[e]	VI[f]	VII[g]	VIII[h]	IX[i]	X[j]
18	M	5	9	8	8	7	9	9	9	8	8
	L	7	6	8	8	7	6	8	7	7	7
19	M	3	7	9	8	9	6	5	5	7	6
	L	7	5	5	6	3	6	5	5	6	8
20[m]	M										
	L										
21[m]	M										
	L										
22	M	7	9	9	9	8	7	8	9	9	9
	L	5	5	3	4	4	2	5	2	2	5
23	M	2	8	8	9	9	8	7	8	9	8
	L	6	7	7	7	4	6	5	8	6	6
24	M	5	7	9	8	8	7	9	9	9	1
	L	1	3	2	3	4	2	5	7	6	1
25	M	2	9	5	9	5	9	9	9	9	7
	L	5	3	7	3	3	5	7	5	3	5
26	M	4	8	4	8	8	5	8	8	8	8
	L	7	5	6	7	7	5	5	6	6	5

TABLE 8 (Continued)

Respondent	Preference Level of Rated Element	Ratings for SAWV Dimensions									
		I[a]	II[b]	III[c]	IV[d]	V[e]	VI[f]	VII[g]	VIII[h]	IX[i]	X[j]
27	M	6	6	5	5	6	7	5	5	5	5
	L	5	6	5	5	5	5	5	5	4	5
28	M	9	8	7	8	8	8	6	8	8	7
	L	8	9	7	6	8	7	5	9	8	7
29	M	7	9	6	8	9	9	9	9	9	7
	L	6	8	8	8	8	7	8	9	9	7
30	M	9	9	9	9	9	7	9	9	9	8
	L	1	9	4	7	4	9	6	3	4	8
31	M	6	7	7	8	8	7	7	7	9	8
	L	5	6	5	7	7	7	6	6	7	7

[a]Price of Merchandise
[b]Quality of Merchandise
[c]Assortment of Merchandise
[d]Fashion of Merchandise
[e]Display and Presentation of Merchandise
[f]Helpfulness of Sales People
[g]Credit Arrangements
[h]Returns and Adjustments
[i]Physical Atmosphere in Store
[j]Nature of the Typical Customer

[k]Most Preferred
[l]Less Preferred
[m]Eliminated because they failed to meet the other-location criterion and an insufficient ESS size prevented the use of a less preferred substitute for a least preferred element.

TABLE 9

RESPONDENTS' TOTAL STORE RATINGS FOR MOST AND LESS PREFERRED EVOKED STORE SET ELEMENTS

Respondent	TSR[a]	
	Most Preferred Element	Less Preferred Element
1	411	401
2	328	269
3	592	563
4	460	420
5	441	279
6	413	312
7	535	494
8	429	413
9	641	494
10	540	526
11	507	369
12	355	334
13	513	441
14	599	486
15	722	632
16	348	317
17	422	379
18	560	496
19	266	238
20		
21		
22	568	238

TABLE 9 (Continued)

Respondent	TSR[a] Most Preferred Element	TSR[a] Less Preferred Element
23	543	463
24	404	180
25	386	209
26	287	258
27	235	216
28	415	404
29	564	539
30	513	304
31	286	243

[a]Number in each column represents the total store rating for a most or less preferred element and is the product of each subject's SAWV and the SRM for each element.

magnitude of absolute location distortion was examined by comparing the percentage distortion levels for most and less preferred elements in terms of both physical distance and time. The direction of relative location distortion was examined by observing interelement angular distortion, i.e. the difference between interelement angles of a MGS and the PGS, in terms of both indirect and direct relative location measures. The direction of absolute location distortion was analyzed in two ways. First, distortion of the difference in the absolute locations of most and less preferred elements was examined in terms of both physical distance and time. Second, the rated convenience of most and less preferred alternatives was compared in terms of closer most preferred element pairs versus more distant most preferred element pairs (defined in terms of PGS absolute location). Finally, the metric property of symmetry was examined by comparing the MGS absolute distance components originally elicited with those elicited in the abbreviated test for the metric property of symmetry. This was done in terms of both time and physical distance. Statistical analysis was completed by application of Fisher's t for testing differences between correlated pairs of means (Guilford, 1965, pp. 183-5). Each hypothesis will be restated in discussing these differences and the results of statistical analysis.

Hypothesis I. Given differences in the preference levels of ESS elements, the magnitude of relative location

distortion will be greater in the case of less preferred elements. Reference to Table 10 indicates that the mean differences of percentage distortion levels associated with the indirect measure of relative location for all subjects and the homogeneous subset of subjects were -15.17 and -18.86, respectively. In the case of the direct measure of relative location the mean differences were -15.14 and -19.14, respectively. In all cases this indicates that the magnitude of relative location distortion was greater for the less preferred elements. All differences proved to be significant and thus the first hypothesis is strongly supported by the data.

Hypothesis II. Given differences in the preference levels of ESS elements, the magnitude of absolute location distortion will be greater in the case of less preferred elements. The mean differences of percentage distortion levels of physical distance, as shown in Table 10, for all subjects and the homogeneous subset of subjects were -11.68 and -13.40, respectively. For the time measure of absolute location these differences were +6.35 and +8.29, respectively. This indicates that the magnitude of absolute location distortion was greater for the less preferred elements in the case of physical distance and greater for the most preferred elements in the case of time. Only the physical distance relationship for the homogeneous subset proved to be significant, although the mean difference for physical distance distortion was significant at

TABLE 10

MEAN DIFFERENCE COMPARISONS BETWEEN MENTAL GEOGRAPHIC SET MEASURES IN TERMS OF THE MAGNITUDE AND DIRECTION OF RELATIVE AND ABSOLUTE LOCATION DISTORTION OF THE METRIC PROPERTY OF SYMMETRY FOR ALL RESPONDENTS AND FOR THE HOMOGENEOUS RESPONDENT SUBSET

Type of MGS Comparison	MGS Measure	Mean Differences: All Respondents	Mean Differences: Respondent Subset
Magnitude of Relative Location Distortion	Indirect Relative Location	-15.17[a*]	-18.86[b*]
	Direct Relative Location	-15.14[a*]	-19.14[b*]
Magnitude of Absolute Location Distortion	Physical Distance	-11.68[a]	-13.40[b*]
	Time	6.35[a]	8.29[b]
Direction of Relative Location Distortion	Indirect Interelement Angle	36.17[a*]	39.05[b*]
	Direct Interelement Angle	28.93[a*]	33.52[b*]

TABLE 10 (Continued)

Type of MGS Comparison	MGS Measure	Mean Differences: All Respondents	Mean Differences: Respondent Subset
Direction of Absolute Location Distortion	Physical Distance Magnification	$-.72^{a}$	$-.48^{b}$
	Time Magnification	1.09^{a*}	$.78^{b}$
	Rated Convenience	$.79^{a*}$	$.42^{b}$
Metric Property of Symmetry	Physical Distance	-14.78^{c*}	-10.21^{d}
	Time	0^{c}	0^{d}

$^{a}N = 29$
$^{b}N = 21$
$^{c}N = 19$
$^{d}N = 12$
*Significant at .05 level.

the .10 level for all subjects. Thus the physical distance data offer partial support for the second hypothesis, while this support is lacking in the time distortion information.

Hypothesis III. Given differences in the preference levels of ESS elements, the direction of relative location distortion will tend to differ for most and less preferred ESS elements. In the case of both indirect and direct measures of relative location such a tendency would be evidenced by systematic differences in the directional distortion of ESS elements. These differences would produce systematic interelement angular distortion. In the case of indirect and direct measures of the interelement angle subject (N = 29) distorting the most and least preferred elements totaled 20 and 21, respectively. In the homogeneous subset (N = 21) this directional distortion tendency was exhibited by 15 subjects for both measures of the interelement angle. Reference to Table 10 indicates that the mean differences of indirect interelement angular distortion for all subjects and the homogeneous subset were +36.17 and +39.05 respectively. The differences for the direct interelement angular distortion were +28.93 and +33.52 respectively. This indicates a tendency to increase the interelement angle between most and less preferred elements. All differences proved to be significant and thus the third hypothesis is strongly supported by the data.

Hypothesis IV. Given differences in the preference levels of ESS elements, the direction of absolute location distortion will tend to differ for most and less preferred ESS elements. This tendency would be evidenced by a systematic distortion of the differences in the absolute location of most and less preferred elements. For purposes of testing the proposition paired observations were divided on the basis of whether the most or less preferred element was closer, in PGS terms. The tendency to magnify the existing relationship, by either increasing the relative closeness of the closer most preferred element or increasing the increased distance to the more distant most preferred element, was considered to be a positive response. Distortion was measured in percentage terms. The physical distance data concerning absolute location, which had earlier shown significant differences in the magnitude of absolute location distortion, failed to reveal the hypothesized response. The mean differences, as shown in Table 10, of -.72 and -.48 for all subjects and the homogeneous subset of subjects actually support the idea that the opposite tendency may exist. In the case of time, however, 17 of the 26 subjects who did distort differences in the absolute location of most and less preferred elements responded positively. In the homogeneous subset of subjects this tendency was present for 12 of the 18 subjects who distorted differences in absolute location. Mean differences +1.09 and +.78, as shown in Table

10, for all subjects and the homogeneous subset indicate that absolute location differences were magnified (Beloff and Beloff, 1961). The level of distortion proved significant for all subjects. Differences in the rated convenience of most and less preferred elements were analyzed by comparing the rated convenience of closer and more distant elements. Although the PGS time differences were nominal, mean differences of rated convenience for all subjects and the homogeneous subset were +.79 and +.42, respectively. This indicates a tendency to rate closer most preferred elements as more convenient than closer less preferred elements. This difference proved to be significant for all subjects. Thus the data concerning differences in absolute location and rated convenience tend to partially support the fourth hypothesis.

Hypothesis V. Given differences in the preference levels of ESS elements, there will be a tendency to violate the metric property of symmetry. As shown in Table 10, the metric property of symmetry was maintained for the time component of absolute location. The mean difference of 0 for separate time estimates, however, stand in sharp contrast to the physical distance mean difference for all subjects and the homogeneous subject subset of -14.78 and -10.21, respectively. This indicates a tendency to regard the distance from the less to the most preferred element as greater than the distance from the most to the less

preferred element. This difference proved to be significant for all subjects.

Conclusions and Implications

The objective of this exploratory research was to study the relationship between the two major components of urban retail environmental perception, the cognitive structure of evoked retail alternatives and the mental geographic set which partially defines the perceived relationship between these alternatives. The implicit assumption in dealing with these relationships is that any dichotomy regarding descriptive and ascriptive properties of a retail structure is unduly artificial and must be replaced by a consideration of the interaction between these properties. Any effort to compare and contrast present conclusions with those drawn from research dealing with negatively valent objects (Beloff and Beloff, 1961; Beloff and Coupar, 1968), neutral and dangerous alternatives (Werner and Wapner, 1955), and emotionally involving and more and less important alternatives (Eckman and Bratfisch, 1965) must be tempered with the recognition that present study is limited to evoked, and thus both familiar and acceptable, retail elements. At present limited knowledge prevents the direct application of our findings to questions regarding reactions to other types of environmental phenomena. A common basis for the eventual integration of findings can, however, be found in the idea that

accumulated information is a key factor which influences spatial movements and produces gaps between perceived and physical or objective space. A further bond with other environmental research efforts may be found in the shared tendency to consider environmental perception as involving a spatial reduction of the environmental situation in analogical form in order to assimilate and manipulate environmental information by reducing, to individually manageable dimensions, the complexities arising from the temporal development of successive actions (Sivadan, 1970, p. 412).

The Evoked Store Set

Variations in ESS size support the contention that urban retail facilities, as one resource category, are not physically or objectively defined entities, but rather are subjectively and selectively perceived urban elements. The limited nature of different ESSs and the variety of ESS elements suggests that the planning of retail inputs for an urban matrix is an exceedingly complex problem. The observed variations in ESS size are difficult to explain without further investigation. Two alternative hypotheses may, however, serve to explain this variation.

First, we may be dealing with a form of spatial sign learning (Golledge, 1969, pp. 105-7) in which the individual anticipates spatial acts, not on the basis of habituated movements, but in terms of the learned location of urban

paths and places. Thus ESS size variations may reflect variable spatial patterns which represent a range of behavior associated with a common anticipated reward structure. Alternatively, variability in ESS size may be a function of reward expectancy or personally defined aspiration levels. If a broad range of alternatives in the product category is expected to provide acceptable results (a reward structure), anticipated search behavior and ESS size may be regarded as unacceptable and more extensive search patterns and larger ESS size may result.

A second hypothesis which may explain ESS size variation concerns stages in the environmental decision process. Variations in ESS size may reflect the different positions of subjects in the decision process. The need to deal with familiar product categories and urban environments make it difficult to control this effect. The inability to control for differences in respondents stage in the decision process has been shown to reduce the level of explanation in spatial behavior research (Golledge, 1969, pp. 111-15) and may account for some of the difficulties encountered in this study.

The influence of both sign learning and decision process behavior may account for the concentration of ESS elements and the resultant difficulties in meeting the other-location criterion for preference opposites. These influences may have been magnified by the operation of a contiguity mechanism producing a spread effect in

environmental learning and reinforcing responses in the vicinity of the anticipated reward or most preferred element.

An interesting and presently unanswered question concerns the functional role played by ESS elements. The sign learning hypothesis does not distinguish between elements functioning as places, i.e., decision alternatives, and elements as part of perceived paths. In the latter role ESS elements configure to form alternative paths to anticipated reward states. Following past suggestions that the totality of the shopping experience is the correct unit of observation (Martineau, 1958, p. 295; Huff, 1961), it may prove fruitful to inquire as to whether a family of routes or multiple paths may exist in each customer's perception of the retail environment. These paths may exist in a preference hierarchy, with certain combinations of elements functioning primarily to facilitate movement through barriers. This set of relationships may, for example, account for unexplained absolute location distortion of less preferred elements. A more direct route to highly preferred elements may contain insurmountable barriers. Perhaps less preferred elements may function to legitimatize an intended visit or purchase at another element and thus not serve as an alternative source of purchase.

Such cautious speculation carries the recognition that the transition from environmental perception to

environmental response is not deterministic. Certainly the passage of time or a visit to even one element may bring a restructuring of both the role of ESS elements and the decision process as a result of accumulated information.

Attribute Salience and Rating

The SAWV results indicate the potential danger in arbitrary determination (Martineau, 1958; McClure and Ryans, 1968) of evaluative dimensions for judging the performance of a retail structure. Attribute salience is a function of both the customer type and the expected pattern of behavior. Furthermore, the equal importance of salient attributes cannot be assumed. SAWV variation indicates the need to reject not only arbitrary measures of competitive retail performance but also measures of competitive performance along salient dimensions which do not include a consideration of the relative salience of different marketing inputs. The SAWV and SRM data which provide the basis for the reported TSRs support the notion that the cognitive structure of a retail element is a complex set of discriminative cues for the expected reinforcement (L. L. Berry, 1969, p. 4; Moore and Mason, 1969) associated with an expected pattern of behavior.

Retail attractiveness has been considered a source of unexplained customer environmental behavior (Rushton, Golledge, and Clark, 1965; W. A. V. Clark, 1968, p. 396).

The present findings support this explanation but also indicate the need to further examine the dynamics of attractiveness. This examination should include an investigation of the morphology of the cognitive structure, the responsiveness of SAWV components to marketing inputs, and the sensitivity of TSR attractiveness to changes in an SRM. One problem in this connection is that the present study deals with acceptable and familiar preference opposites and may provide insights only generally related to research efforts in which acceptability and familiarity are not of immediate concern (D. L. Thompson, 1963; Feldman and Star, 1971).

Mental Geographic Sets

The use of a set and subset of respondents was intended to provide a reference for future attempts to examine differences in the responses of urban residents to their urban environment. The employment of multiple measures of relative and absolute location was intended to provide a basis for determining the most appropriate instruments for testing hypotheses relating to urban retail perception and customer environmental behavior.

While present conclusions are tentative, it appears that the absolute location responses of different groups may reflect different environmental perceptual functions. Relative location differences are more difficult to discern at this stage in the research process. Results generally

support the contention that customer interpretation of the surrounding urban spatial field is highly personal (Sonnenfeld, 1969, 1971) but relatively consistent within customer groups. This tendency points to the need to consider fashioning the urban matrix in terms other than its objective geometric properties in order to achieve congruence with the needs of different urban residents. If different groups do possess different environmental perceptual tendencies, it is especially important to identify the marketing implications of present and future urban designs.

Multiple measures of relative location do not appear required, although further tests of this conjecture are no doubt necessary. This is evident in light of the complexities encountered in terms of absolute location measures. The dimensions of spatial experience and perception seem to extend beyond time and distance to include information, uncertainty, and physical design (Reynolds, 1953; Jung, 1959; Lowrey, 1970). Multiple locational concepts seem to be grouped together in an undetermined fashion and thus distance, time and convenience measures are subjective phenomena which are distorted by personal evaluation of the element in question as well as a number of other factors which merit future scrutiny. Sensitivity to time and physical distance are thus understandably different. It is doubtful whether a single absolute location response measure can be shown to refer to a dominant variable in

the environmental decision process and also have clearly superior capabilities in predicting customer environmental response (Scott, 1970, pp. 169-171). In its present form, rated convenience can not act as a time and distance surrogate. With proper modification it may prove useful as a generalized MGS measure which can explain some of the apparent interactions between other locational concepts. Meanwhile, continued application of multiple location measures seems necessary.

Relative and absolute location distortion tendencies may be accounted for in terms of differences in familiarity based on either past interaction with elements or the latent learning (Golledge, 1969, p. 107) of residents as they carry on other activities. Still, the use of evoked elements reduces the probable influence of either form of familiarity and leads to a consideration of other sources of distortion.

In addition to the effect of preference, there seems to be a microlocal bias acting as a source of relative location distortion. This source is revealed by discarding the PGS home origin coordinate system, which was used to make relative location measurements. Instead a coordinate system may be developed by using MGS relative location responses to determine an approximate origin. These steps produce a perceived origin northeast of the home origin and closer to the entrance of the housing complex. This is the position which respondents would typically

occupy only in an automobile. This subjective transformation from a home-centered to an auto-centered orientation system is consistent with both the larger magnitude of relative location distortion for less preferred elements as well as the direction of the relative location distortion and the interelement angular distortion. While there are many potential sources of such systematic orientation bias, three possibilities merit consideration and future exploration. First, the microlocal bias may reflect the influence on environmental decision behavior of an automobile-dominated transportation system. Second, the orientation bias may have its roots in a tendency for intensive social use of housing complex facilities to lead to an inability to discriminate home origin from other points and to treatment of the complex and its extended parking facilities as a generalized origin. Finally, the aspiration levels of residents of a medical student complex[3] may lead to shifts in orientation systems away from temporary married housing. In all cases the result would be a shift in the perceived origin and the reported types of relative location distortion. It is unlikely that any single source of microlocal bias exists. In addition it is probable that such bias, whatever its source, would only interact with, and in this case, magnify the tendency

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[3] In all cases except one the subjects were wives of medical students.

to separate preference opposites in imaged urban retail space and distort the locations of less preferred elements to a greater extent.

Absolute location distortion is more difficult to interpret. A familiarity effect may be operating but, as in the previous case, its influence should not be great. The inverse relationship between preference and the magnitude of absolute location distortion for physical distance is consistent with the relative location findings. The sensitivity to physical distance appears to be a function of the cognitive structure of the element whose absolute location is being perceived. Imaged urban space evidently lacks even the uniformity which consistent distortion would provide. While the magnitude of time distortion differences did not prove to be significant, it may be that time is experienced in a different manner than distance. This is not surprising since the PGS physical distance component is relatively stable but time varies over parts of the day and week (Scott, 1970, p. 170). When direction of distortion is considered, further dissimilarities between physical distance and time are present. The absence of significant systematic distortion of differences in absolute location in terms of physical distance appear to stem from significant differences in the magnitude of distortion of preference opposites. The fact that the reverse is true in the case of the time measure (for all subjects) can be explained in similar

terms. Customers may consider time to be more significant and may be especially sensitive to time differences when they interact with preference differences. If perceived time is considered as one measure of perceived effort these results indicate that, for the variables in question, perceived effort and preference are inversely related when the most preferred element is closer and are directly related when the most preferred element is more distant. It is doubtful whether these observed tendencies indicate the existence of a symmetric effort-preference function since closer most preferred elements tend to be rated as more convenient than closer less preferred elements.

In terms of its metric properties, imaged retail space appears to possess symmetric characteristics in terms of time but not physical distance. This may reflect customers' apparent sensitivity to time versus physical distance. It should be recalled that the symmetry test was applied only in interelement terms. The findings regarding the direction of absolute location distortion in terms of time and rated convenience suggest that time may not be symmetric when home origin is used as one point. While further testing is necessary, the absence of physical distance symmetry may reflect anticipated trip patterns and the order of expected interaction with an element. In this sense, the perception of distance as being greater in the less preferred direction may reflect not

only the influence of cognitive structure but also a reversal of the expected interaction order. This question is beyond the scope of the present study. The results do support the hypothesis that preference differences cause metric properties, which characterize the PGS or objective retail space, to be violated in the CEM.

The question of symmetry also rises in another connection. A number of years ago Brennan (Brennan, 1948) observed a tendency of customers to prefer not-too-distant shops in the direction of the city center rather than shops in the reverse direction, even when the latter were nearer. More recent tests of "Brennan's Law" of shopping behavior by Lee (Lee, 1962, 1967) strongly support the hypothesis. Lee explained the evidence supporting Brennan's earlier observations in terms of enhanced selectivity toward the center of the city and the schemas or environmental perceptions of residents. In the latter case it was suggested that such schemas were strongly influenced by a focal orientation developed by successive satisfactions in the direction of the city center. In contrast, Golledge, Briggs, and Demko (Golledge, Briggs, and Demko, 1969) have suggested that increased travel time and congestion increase the perceived distance between places and that denser packing of land uses toward the CBD create positive absolute location distortion in terms of physical distance. It may prove interesting to examine shifting focal orientations produced by malls and shopping

centers competing with the CBD. Although this question did not arise in the present study, it is interesting to note both a tendency by subjects to concentrate ESS elements in a particular mall and the absence of clear support for either the Brennan and Lee or Golledge, Briggs, and Demko positions. The lack of even tentative support for either view suggests the viability of the congruence concept, the absence of dominance by either physical or non-physical systems, and the need to further develop the CEM as a component of a more general model of customer environmental behavior.

The previous results indicate that the study of environmental behavior will provide valuable insights for both marketing and urban planning theory. At this stage, the support for specific hypotheses is not as important as the more general evidence which suggests that the CEM model can contribute to our understanding of environmental decision process behavior by helping to define the significant dimensions of customer environmental perception.

FINAL SUMMARY AND CONCLUSIONS

The relationship between customers and urban environments is an important but neglected area in marketing thought. Our cities have long since exceeded some critical mass and become complex environments rather than temporary retreats from natural surroundings. This growth has transformed the urban retail structure into an environmental component. The implications of this transformation are especially important in an era of urban planning. The characterization of the city as a marketing institution has led to the development of hypotheses explaining the nature of urban retail structure in terms of the relative costs of moving goods and people, consumer uncertainty, various dimensions of customer behavior, shifting retail location, and changes in urban retail functions. The absence of unified theory relating to urban retail structure has not, however, retarded efforts to plan and construct the retail component of the urban complex. Societal pressure as well as the resource, structural, and productivity dimensions of urban space have left no other alternative.

One result of planning in the absence of a general theoretical framework has been continued malfunctions in

the ekistic synthesis which comprises the urban man-environment system. Such malfunctions are often the result of isolating physical planning from human needs, and either ignoring or failing to initially specify requisite behavioral criteria.

Marketing can contribute to improved urban planning programs by developing constructs capable of translating empirically derived behavior goals into plans for the provision of urban retail facilities. Such development requires the formulation of a model of customer environmental behavior. There are five requirements for a model of environmental behavior. First, the description and analysis of environmental behavior must be ego-centered. Second, the relationship between an individual and an environmental situation must be seen as a reciprocity, involving a dual interchange. Third, the environmental situation must be seen as possessing objective and phenomenological features. Fourth, the environmental situation must be seen as influencing environmental behavior by acting as a behavioral context and/or as a proximal and distal stimulus. Finally, the environmental behavior model must relate its basic elements, the individual, the environmental situation, the environmental decision process, and environmental response behavior in terms of intersystem congruence.

In order to understand the relationship between customer environmental behavior and the retail spatial

system it is necessary to focus on the subjective basis for customer environmental decisions--urban environmental perception. Urban retail environmental decisions are made by customers with a limited ability to deal with macroenvironmental complexity. Therefore, of necessity, customers simplify and adjust their personal conceptions of urban retail reality.

The present effort represents an attempt to study such personal conceptions in terms of a construct called the customer environmental map (CEM) which is a modification of Stea's experimental model for studying mental maps. The objective is to evaluate the degree of correspondence between imaged retail space and physical reality, and to identify potential sources of disparity.

The CEM was employed as an exploratory behavioral output mode capable of eliciting a customer's mental representation of relevant urban retail reality in terms of an imaged one-, two-, or three-dimensional array of points representing retail elements or stores. Several hierarchical arrangements among these points may coexist or exist at different times. Within the boundaries of this imaged retail space, two points are considered as connected if an actual or imagined path exists between them. The points themselves are cognitively structured information categories and are related to each other in terms of a subjective set of geographical relations, the Mental Geographic Set (the MGS), including absolute

location, relative location, extensity, and intervening barriers. The customer's environmental map was defined as a bounded, one-, two-, or three-dimensional space containing a finite number of retail points connected by paths with various interposed barriers.

The CEM model was used to generate hypotheses regarding the relationship between the cognitive structure of retail elements in the evoked store set (ESS) and geographic set distortion, in terms of relative and absolute location and symmetric properties. The cognitive structure of retail elements was measured in terms of a salient attribute weight vector (SAWV) and a store rating matrix (SRM). The SAWV contained information concerning the relative importance of salient store attributes (SSAs), which were considered important by customers and which potentially differentiate retail elements. The SRM contained the relative ratings of ESS elements in terms of SSAs. The product of SAWVs and SRMs was a set of store ratings which served as a measure of preference.

The study involved two major types of CEM measurements, those defining the cognitive structure of ESS elements and those defining the MGS in terms of relative and absolute location. A standardized personal interview was administered to 31 student housing complex residents. The research design called for the specification of an expected pattern of behavior regarding the character and nature of a forthcoming trip, a particular product class,

defined purchase intention, and an indication of the extent of prior knowledge. The specification of an expected pattern of behavior made it possible to elicit an evoked store set response. ESS elements were treated as macroenvironmental information categories and examined in terms of their cognitive structure, i.e., in terms of SAWVs and SRMs. Multiple measures of relative and absolute location were applied to examine the relationship between cognitive valent meaning and mental geographic ordering of ESS elements.

Size variation and concentration of ESSs, possibly related to sign learning tendencies, variations in environmental decision process stages, and the functional role of ESS elements, appeared to introduce some unexplained complexities into the relationship between the cognitive structure measure of preference and the MGS measures. The results, however, generally support the proposition that preference is systematically related to the magnitude and direction of relative location distortion and absolute location distortion and that the symmetric properties of a PGS (urban physical reality) may not exist in a MGS. More importantly, the results indicate the value of future application and continued refinement of the CEM as a model of customer environmental perception.

Of particular importance in future research efforts is the need for improved description of CEM space in terms of 1) the major retail elements, the relations between

these elements, and their interrelations with the CEM, 2) the spatial extent of the CEM and possible hierarchies of elements, and 3) the surface, boundary, and continuity properties of the CEM. Possible sources of perceptual distortion should be extended beyond cognitive structure preference to include familiarity (due to active and latent learning processes) and physical characteristics (such as the density of urban land use, concentration of retail elements, and the existence and permeability of intervening barriers). Such research will help develop improved instruments to measure the complexities of environmental perception and will thus increase the operational validity of the CEM construct. As a component in a more general model of the customer environmental decision process, the CEM has the potential to enrich our knowledge concerning customer decision process behavior and to act as a valuable input in both the formulation of marketing strategy and the urban planning process.

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

R. B. Thompson, Chairman
Professor of Marketing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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